FINAL REPORT

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FINAL EVALUATION OF THE CANADA-SASKATCHEWAN AGRI-FOOD INNOVATION FUND

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Prepared by: Garven & Associates Ltd.

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Canada

Saskatchewan

Garven & Associates

Management Consultants

Final Evaluation of the Canada-Saskatchewan Agri-Food Innovation Fund

Prepared For:

AGRI-FOOD INNOVATION FUND

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March 25, 2003

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EXECUTIVE SUMMARY

The governments of Canada and Saskatchewan established the **Agri-Food Innovation Fund** (AFIF) in 1995 to address the need for research, development and innovation in Saskatchewan agriculture. Producers, policy makers, and program planners recognized that the agriculture sector was experiencing rapid change. Change has been experienced in such areas as commodity transportation, farm support programming, global marketing, production practices, information technology and in many other areas of the industry. These unprecedented changes have necessitated a new and innovative approach to provincial agriculture. AFIF was established to support the agricultural sector's challenges as it addressed these and other changes. Specifically, AFIF focused on research, infrastructure development and marketing research as tools to support change.

AFIF was designed to address Saskatchewan's needs for infrastructure, research, development, value-adding and marketing.

The objectives of the AFIF program have been as follows:

Objectives of the Agri-Food Innovation Agreement
1. To support the development of emerging primary and value added agriculture sectors in Saskatchewan by providing assistance for research, development and infrastructure needs.
2. To facilitate transition to a more market driven economy for the Saskatchewan agri-food industry; by enhancing the diversification of the Saskatchewan Agri-Food industry, supporting research and development in the Saskatchewan agri-food industry; and encouraging Saskatchewan farmers and rural residents to create economic opportunities and jobs.
3. To support Saskatchewan's commitment to do its part in meeting Canada's targets in agri-food exports and pursuing a market share of at least 4% of global agriculture and food trade.

This report represents the final evaluation study of the AFIF program. Now that the full term of the program has come to a conclusion, there is a need to describe and quantify, where possible, the

Final evaluation considers the impact that the program has had and will continue to have.

successes that have been achieved as a result of the investment. The purpose of the evaluation is to provide the Board of Directors, the senior management and the stakeholders of the program with an examination of the effectiveness and impacts of the AFIF program. The lessons identified through a final evaluation study are often used by program planners to develop more effective programming in the future.

The impacts of research, development and infrastructure are felt over a long period of time.

In the case of the AFIF program, a program designed to focus on research, infrastructure development and marketing, it is very early in the impact stage of the initiative to accurately quantify the outcomes and impacts that have been achieved. Nevertheless, this evaluation provides indicators of early success and assumes that future success will be achieved as the effect of the program is felt over the next ten to fifteen years.

Program Description

The AFIF Program represents an original financial commitment of $91 million to the development of research, infrastructure and marketing information. The Government of Canada allocated $64 million while the Government of Saskatchewan allocated a total of $27 million. An additional $2.8 million of interest earned on the investment was incorporated into the overall available funding, resulting in a total of $93.8 million available for project support and administration.

New and emerging sectors of agriculture were chosen for investment through eight Strategic Areas.

Eight key Strategic Areas were identified at the onset of the AFIF program. During the selection of Strategic Areas, the goal was to support growth and development in emerging and value-added sectors of the provincial agricultural industry. As new sector entrants, or as small components within the agriculture industry, many of these Strategic Areas had not traditionally received a significant amount of research and development funding in the past.

Projects were selected in each of the Strategic Areas to address potential opportunities and to overcome the constraints that were identified in the sector's ability to grow and advance. The following chart outlines the expenditures within the AFIF Program:

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Total Spending by Strategic Area		
Strategic Areas	**Allocated Dollar Value (Millions)**	**Percentage**
Biotechnology	$23.2	25%
Sustainable Agriculture	16.6	18
Food Processing	16.4	17
Specialized Crops	14.7	16
Non-Food Processing	6.7	7
Specialized Livestock	6.6	7
Horticulture	4.8	5
Information Technology	2.0	2
Administration	2.8	3
AFIF Total (Including Interest Earned)	$93.8	100%

Evaluation Methodology

The final evaluation of the AFIF program has been designed to focus on issues of effectiveness and impact. The methodologies employed by Garven & Associates targeted the collection of relevant data regarding the outcomes and achievements of individual projects. The aggregated responses in each of the Strategic Areas have provided an overall assessment of the impact of the AFIF program.

Data collection focused on finding evidence of program effects and impacts.

In order to collect program information and data, several broad-based evaluation strategies were used including:

- Program and Project File Review
- Evaluation Framework Workshop and Revisions
- Literature and Agricultural Statistics Review
- Broad-Based Project Proponent Mail Survey
- Key Informant Interviews
  - Strategic Area Managers
  - Board Members
  - Agricultural Stakeholders

Interviews were held with informed individuals who had knowledge about various aspects of AFIF

- Program and Infrastructure Users
- Administration and Management

Primary data collection tool was a broad-based project survey. . .

The broad-based survey produced a high rate of response with 68% of total funding and 53% of total projects reporting. Approximately 90 interviews were completed with key informants, with knowledge of AFIF, either in-person, or by telephone which provided in-depth understanding of program effectiveness and impact.

A good response rate provided quality data

When conducting evaluation studies, Garven & Associates adheres to the principles and guidelines established by the Treasury Board of Canada. By following a set of common principles, an evaluation can be submitted that highlights the key lessons learned and that provides direction to future program designers.

The evaluation model used by Garven & Associates provided a framework for assessment of social, economic and environmental impacts. The survey yielded sufficient data to measure several economic impacts to date. We tried to use economic tools (eg., benefit-cost analysis, return on investment) to assess the aggregate benefits of AFIF but found that it was too early for respondents to provide good quality data on future impacts of projects.

The report reflects a synthesis of what was heard from interviews and the survey.

During final evaluation studies, the emphasis is placed on results, outcomes and impacts. The AFIF program has had a limited number of years (April 1995 – March 2003) to operate. Therefore it is difficult to ascertain with any certainty the level of the impact that has been accomplished through the investment. Thus, the final evaluation is taking place early in the impact stage of the program. Many of the AFIF approved projects will require several more years to demonstrate the full impact of the investment.

This evaluation project has been designed to identify early indicators of success. To a lesser degree, relevance, program efficiencies and linkages have also been considered.

Was the Fund Needed and Relevant?

The AFIF program was established to assist Saskatchewan producers to address challenges arising from dramatic changes in the

agricultural sector. With a focus on research and infrastructure development, the AFIF program has been designed to advance the provincial agriculture industry through the development of several emerging sectors and through the enhancement of value-added potential.

A strong rationale for AFIF programming emerges from the need to adapt to change.

The rationale for program support such as AFIF was strong throughout the life of the program and remains strong today. There continues to be a need for programs and financial resources that support the agricultural industry as it moves from a commodity-based sector to a more product oriented agricultural sector. Product-oriented agriculture focuses on the entire value-chain capitalizing on opportunities that emerge from diversification, value-adding, marketing and innovation.

Saskatchewan agricultural producers, researchers and policy makers were already following the trend toward a more diversified, product-based agricultural industry when the AFIF Agreement was signed. AFIF spending served to support this trend through investments in capacity building, both in capital infrastructure and through human resource advancements. For example, in the biotechnology sector, AFIF investments helped to build a platform for advancement in research. In the horticulture sector, production development and marketing knowledge will enhance the potential of specific crops such as saskatoon berries and seed potatoes. In other cases, AFIF investments helped to advance projects from the idea stage through to commercialization. The Food Industry Development Centre is a good example of an AFIF-supported project that has enhanced product ideas.

AFIF has made a significant contribution to the advancement of provincial agriculture.

Agricultural stakeholders, interviewed as part of this evaluation research, have clearly stated that the AFIF programming made a significant contribution to the advancement of the provincial agricultural industry. This type of program funding continues to be necessary in the future to build capacity, to advance innovation and to pursue opportunity.

Did the Fund Operate Efficiently?

Out-of-pocket costs to administer AFIF have been low.

The AFIF program has operated with a relatively small administrative budget allocation compared to other programs of its type and size. Total administrative expenses documented by the Secretariat (Board and Committee costs, expenses associated with communication and evaluation, public reporting and in-house administrative expenses) have been approximately 3% of the total budget, or $2.8 million. Funds of about $3 million were provided to the University of Saskatchewan and to the Agriculture and Agri-Food Canada Research Centre, to administer related projects. Therefore a total of 6% of the AFIF Program resources were dispersed for administrative costs. In addition, there were in-kind administrative, managerial and implementation contributions made by both the federal and provincial governments.

There are thousands of untracked administrative hours provided by federal and provincial government employees and individual project managers that are not included in the documented administrative costs of AFIF. The AFIF program was administered without incremental budget allocations for administration. Therefore, management, administration, monitoring and tracking of AFIF projects has been done by staff members who have added AFIF responsibilities to their existing work load. As a result, the real administration costs of the program are unknown.

Project stakeholders report a high level of satisfaction with administrative efficiencies.

Stakeholders and project proponents report a high level of management efficiency. Survey respondents who received project funding indicated a high level of overall satisfaction with the program, with 95% indicating that they are either satisfied or very satisfied. Contracting, payment timeliness and scheduling and communication were all identified as strengths of the program administration.

Although the limited administrative budget did not allow for formal project monitoring and tracking, the AFIF program instituted a comprehensive process of project reporting and renew. All contracts required that work plans, regular reports and written deliverables be submitted prior to funds being advanced. Project reports were reviewed by program managers and external reviewers were utilized to ensure due diligence.

Communication has been significantly enhanced in the latter half of the AFIF program through innovative communication strategies. In 2000, an AFIF Conference was convened in Regina where project progress and outcomes were shared with a broad audience of agricultural stakeholders. "Cultivating Change; the final report on projects supported by the Canada-Saskatchewan Agri-Food Innovation Fund" was produced in 2001 and widely distributed to interested individuals and groups within the industry. The AFIF web-site was also used extensively for communication. All of these communication tools were well received by stakeholders.

Overall, the AFIF Program has been administered in an effective and efficient manner. Administrative processes, contractual arrangements and accounting procedures have all been managed effectively.

Was the Fund Effective in Achieving Long-Term Goals?

Programs that focus on research, development and infrastructure creation require time for impacts to be realized and before it is possible to effectively measure whether the program investment has resulted in a significant impact. The majority of AFIF investments have been made to foster long-term benefits to the research community and eventually to agricultural producers. At this point, it is possible to determine whether indicators exist that support the assumption that long-term goals will be realized, but more time will be needed to effectively measure overall impact.

Long-term goals are directly related to the potential for impacts . . .

In the AFIF Management Performance Framework, there are six long-term evaluation questions posed. Each of these questions must be considered in order to answer whether AFIF has been effective in achieving long-term goals.

it is early to quantify impacts in research, development and infrastructure initiatives.

1. *Have the AFIF program activities resulted in the creation of additional capital and human resource infrastructure?*

Capacity building has been a key function of the AFIF program. Based on survey responses, it is clear that capital infrastructure, research and development, technology transfer and the creation of new information and understanding have been outputs of the AFIF investments. In addition, human resource capacity has been enhanced

through skill development programs, technology transfer and information sharing.

2. *Has the economic performance of the Saskatchewan agri-food industry been enhanced?*

Economic impacts have been limited to date.

Economic performance is typically measured through increased employment, improved sales, reduced costs, industry growth and the overall creation of wealth. To date, AFIF has realized a limited number of these types of direct and indirect economic benefits. Improved awareness of management and production issues, broad-based agriculture industry and sector development, research advances and technology development are most often cited as early benefits achieved through AFIF projects. When survey respondents were asked to identify economic benefit, half of the respondents identified that their projects had resulted in new products or processes, reduced costs, new intellectual property and/or new patents.

It is important to note that 72% of the survey respondents indicated that the benefit of their projects was expected to be on-going, with only 2% of the respondents suggesting that the potential for impact within their projects was complete. Therefore, the infrastructure developments, research advancements and improved human resource capacity will impact on the agricultural industry into the future.

At this point in time, the full economic benefit of the AFIF investment is unknown because it is still developing.

3. *Has the technical expertise of Saskatchewan's agri-food industry been enhanced?*

Technology advancements have been made through research and infrastructure development

AFIF programming has enhanced the technical expertise of Saskatchewan's agri-food industry in several of the strategic areas. New and/or enhanced expertise has been developed in numerous areas such as; biotechnology, plant breeding, specialized livestock disease management, precision farming techniques, agricultural production techniques, environmental stewardship, vegetable and fruit processing, and water quality management. Research, demonstration, technology transfer, improved awareness and educational capacity building were reported as key activities in AFIF supported projects. All of these outputs contribute to enhanced technical expertise within the province.

Technical expertise has been developed at several different levels of the agricultural industry including agricultural producers, researchers, scientists, program managers and students.

4. *As a result of program initiatives, has the Saskatchewan agri-food industry become better equipped to address the rapid changes in agriculture? Have Saskatchewan producers and processors adopted new technologies, products, processes and practices which have arisen as a result of program initiatives?*

Project managers reported that the main behavioural changes that have occurred as a result of AFIF spending have been increased awareness and education and the adoption of innovative strategies. Examples of technology adoption influenced by AFIF investments include the use of advanced minimum tillage and precision farming practices, improved processing of fruits and special horticultural crops, enhanced soil conservation practices, better disease management in bees and specialized livestock, improved feeding practices in specific livestock species and improved quality control systems.

5. *Has the AFIF program supported projects which address the emerging priorities within Saskatchewan agriculture?*

Yes, the AFIF program has addressed emerging priorities in Saskatchewan. The eight Strategic Areas that AFIF focused on were identified as a result of a series of board meetings and industry consultations that were convened in 1995. The eight Strategic Areas within AFIF complemented the direction of the Government of Saskatchewan, as identified in their Report to the Industry entitled, "Agriculture 2000, A Strategic Direction for the Future of Saskatchewan's Agriculture and Food Industry," where crop processing, food processing, specialized crops, specialized livestock, hog production and horticulture were identified as priority areas.

Projects were selected on the basis of industry consultation and in concert with provincial priorities.

In order to be responsive to emerging issues, the AFIF Board allocated approximately $20 million for Reserve Fund initiatives. These initiatives fit within the Strategic Areas but were designed to advance emerging issues that were not clearly defined within the original strategic area work plans.

6. *Has the AFIF program contributed to Saskatchewan agriculture's ability to move toward a more market driven economy?*

AFIF has fallen short of achieving its goal to move Saskatchewan toward a more market-driven economy.

The focus of the AFIF program has been on agricultural industry advancements through investment in research and development and through the building of infrastructure. To a much lesser degree, a few projects have been selected to advance market intelligence and to better understand value-added opportunity.

Given the break-down of AFIF investments (approximately 51% on infrastructure and 44% on research and development), AFIF board members demonstrated their belief that market opportunity and greater market potential will result as a spin-off benefit from investments in research, development and infrastructure. Only time will tell whether this assumption will result in Saskatchewan's ability to move toward a more market driven agricultural economy.

To date, greater sales, new markets and increased exports have not been a significant outcome of the AFIF investment. These outcomes may, or may not, be forthcoming as the full impact of the research, development and infrastructure investments are documented.

Have AFIF Results Impacted on the Saskatchewan Agricultural Industry?

Both direct and indirect AFIF impacts have been somewhat limited to date as a result of the short timeframe that has been available for outputs to affect the agricultural industry.

Through the broad-based survey of project proponents, an initial listing of impacts has been has been identified:

Direct Impacts:	Employment	365
	Reduced Costs	$2 million
	New Sales	$40 million
	New Processes	76
	New Products	203
	Program Reach	32,731 producers

Indirect Impacts:	Value of Research	$8.5 million
	Value of Spin-Offs	$11.1 million
	Leveraged Funds	$23.7 million

Did AFIF Support Linkages?

Generally, there has been a low level of additional research dollars leveraged by current AFIF investments. Interviewees reported that, due to the short timeframe available to develop project proposals for the Fund, the ability to secure leveraged dollars was compromised. A reported $23,700,000 was leveraged as a result of the $91,000,000 million investment from AFIF.

AFIF resulted in a cooperative approach to Fund management between both levels of government.

AFIF contributed to closer working relationships with some of the province's key agricultural support agencies. By supporting and requiring the development of Memorandum of Understanding Agreements between certain agencies, AFIF advanced closer working relationships during the period of this federal/provincial Agreement.

The AFIF program fostered linkages between the two key implementing groups; the federal and provincial governments. On many projects, both governments were involved in the management, implementation and reporting of results. These linkages lay the groundwork for future cooperation on agricultural projects in the province.

Conclusions and Recommendations

The purpose of this final evaluation study has been to consider the effectiveness and the impact of the AFIF investments as they relate to the Saskatchewan agricultural economy. Therefore, the following conclusions specifically focus on issues of Effectiveness and Impact with a more minor consideration given to issues of Rationale, Efficiency and Linkage.

During final project evaluation, the recommendations that are presented are offered for consideration in the design and implementation of future like-minded programs. The administration and delivery of the AFIF program is nearly complete and therefore, there is little opportunity to apply recommendations to the existing program. However, the final three recommendations presented are designed for the Board to take immediate action on.

Conclusions

1. ***AFIF has been a key contributor to research and development in targeted agricultural sectors within Saskatchewan.***

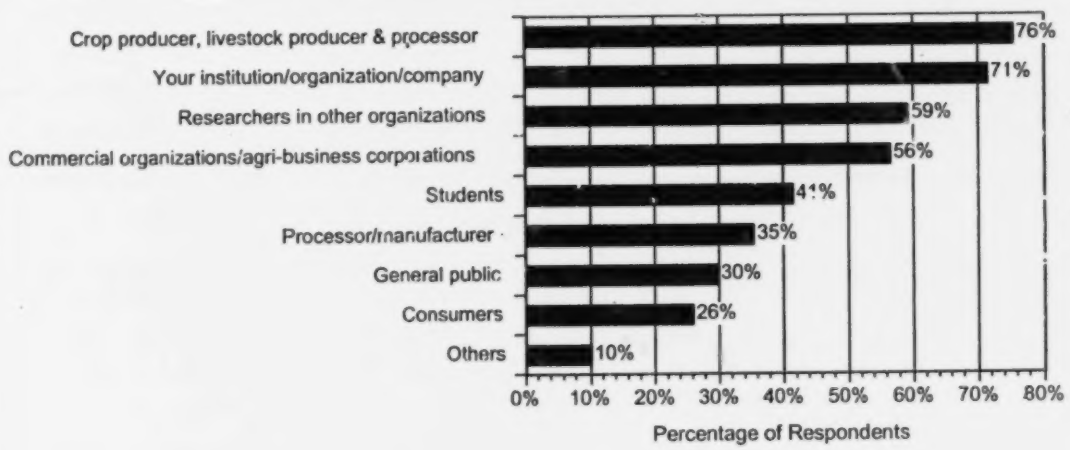
AFIF has contributed $48 million to the creation of infrastructure that will advance the capacity of the agricultural sector both today and into the future. Another $41 million has been committed to research and development with the belief that these types of investments will result in the province's ability to take advantage of added capacity and move toward a more market driven agricultural economy.

Infrastructure	51%
Research & Development	44%
Value-Adding	2%
Administration	3%

2. ***Project fund recipients report that AFIF programs have reached a large target audience of producers, processors, agricultural organizations, researchers, policy makers, students and consumers.***

Survey respondents indicate 32,000 farmer contacts have been made over the life of the Agreement. Contacts included participants in demonstration days, recipients of communication and information tools and users of new technologies.

Survey Respondent's Allocation of Project Benefit*



* More than one beneficiary could be identified by each of the respondents.

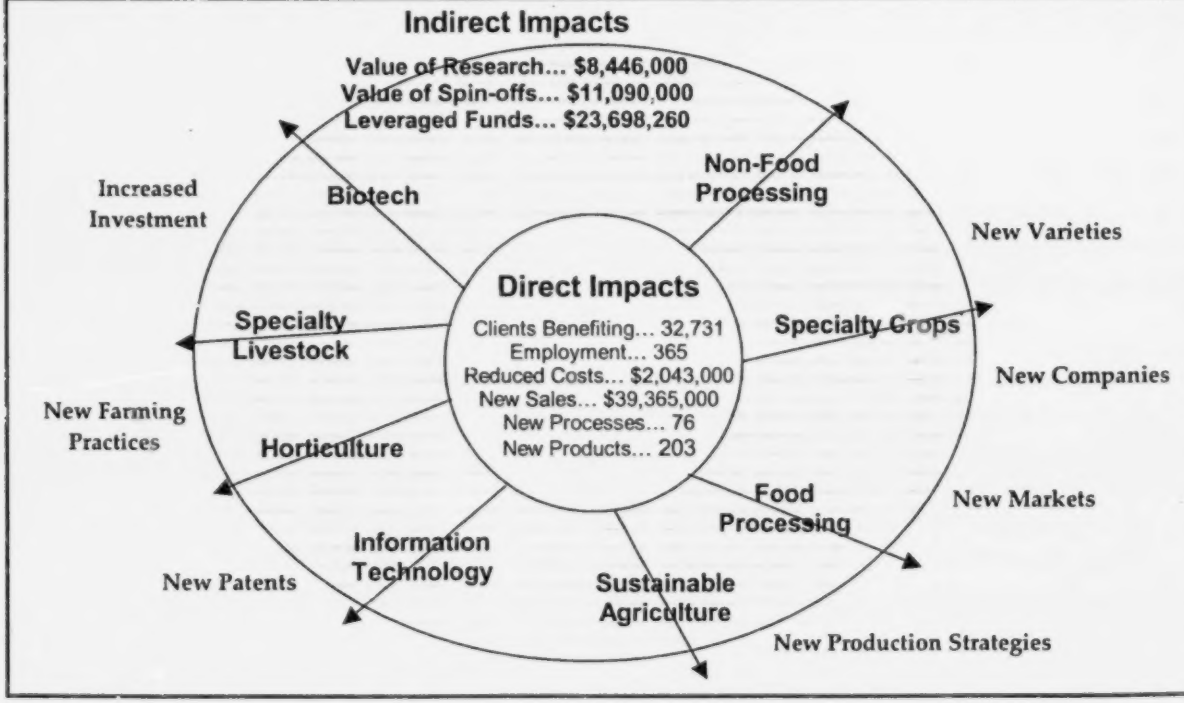
3. ***Project managers report that AFIF has generated a number of benefits to the Saskatchewan agricultural industry.***

Reported benefits include behavioural and environmental change as well as overall economic advancement. Many of the projects were designed to introduce new management and production practices and project fund recipients report that farm managers have embraced some of these changes.

4. ***By its very nature, research and development requires a significant amount of time to elapse before measurable impacts can be documented.***

The AFIF program invested primarily in research, development and infrastructure. The results, outcomes and impacts of this type of activity are normally realized over the long-term. To document the initial impacts that can be measured, the concept of 'Concentric circles of impact' has been used. Direct, quantifiable impacts are found in the centre of the circle model. These are easily measured and many of the direct impacts can be identified in the short-term. However, just as a pebble is dropped into a pond, there are ripple or spin-off benefits. These can be considered to be indirect benefits. Often, they are more difficult to measure. On the outside of the circle model, a number of long-term benefits have been identified. At this point in the life of the AFIF program, the full impact of the program is unrealized. It is assumed, that over time, the full benefit of AFIF investments will be felt by the agricultural community.

Direct and Indirect AFIF Impacts



5. ***A low level of additional research dollars has been leveraged by current AFIF investments.***

It is true in programs like AFIF, where the investment emphasis has been on research, development and infrastructure, that it is somewhat difficult to attract private sector investment. The majority of encouraging investment of incremental achieved by AFIF was in the ability to leverage other government resources. Overall, AFIF has had very limited success in leveraging financial resources with a reported leverage rate of about $1 of AFIF resources to $0.25 of other sources of funds. Other programs such as WEPA and CARD have demonstrated leverage rates of $1 of program funds to $13 or more of other funds.

AFIF Investment	Additional Funds Leveraged
$91,000,000	$23,700,000

Some of the surveyed project managers reported that they did not have enough time to identify leveraged sources of funds. The timeframe to prepare and submit proposals was very short in order to meet the AFIF submission deadlines. Leverage is one measure of cooperation and collaboration in projects. A low leverage rate is an indicator that proponents either did not collaborate with others or had insufficient time to develop jointly funded proposals.

6. ***AFIF allocated the majority of the investment funds early in the life of the program, over an eighteen month timeframe. Rapid commitment of research, development and infrastructure funds has resulted in some unwanted outcomes.***

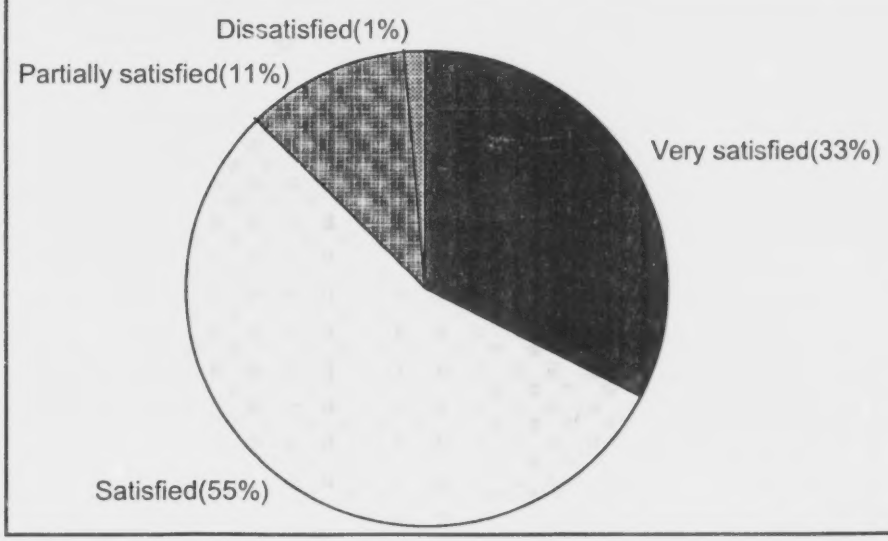
In order to make funding decisions in a short period of time, a number of administrative and management issues were necessarily compromised. Comprehensive due diligence which included market demand, service potential and feasibility analysis was not thoroughly completed for several large infrastructure projects. The annual AFIF business plan and the regular review of such a plan were not completed. Total leveraged funds realized were low as project

applicants reported that they didn't have the time to develop a plan to access these leveraged funds. With the majority of the resources allocated at the beginning of the program, it was difficult for AFIF to respond to emerging areas of concern or new programming issues throughout the life of the program.

7. ***Both participants in the AFIF program and stakeholders that have been involved with AFIF report a high level of overall satisfaction with the efficiencies of the program.***

Direct AFIF administrative costs are approximately $2.8 million or 3% of the overall Fund. Administration of Agriculture and Agri-Food Canada Research Branch projects and administration of the University of Saskatchewan endowment and research chair programs total another $3 million. There are undocumented administrative costs that have been incurred by both the federal and provincial governments as they have managed and implemented the AFIF Agreement. Based on estimates of time and resources allocated by government administrators and project managers, it is estimated that these costs could represent as much as another $4 million. Overall, administration of the program has been maintained at under $10 million which compares very favorably to other funding programs of this nature.

Project Manager Satisfaction with Administration



8. ***AFIF had three key goals. Direct AFIF investment focused on the first goal and assumed that the second and third goal would be met as a result of project outputs and spin-off benefits.***

> Goal #1 To support the development of emerging primary and value-added agriculture sectors in Saskatchewan by providing assistance for research, development and infrastructure needs.

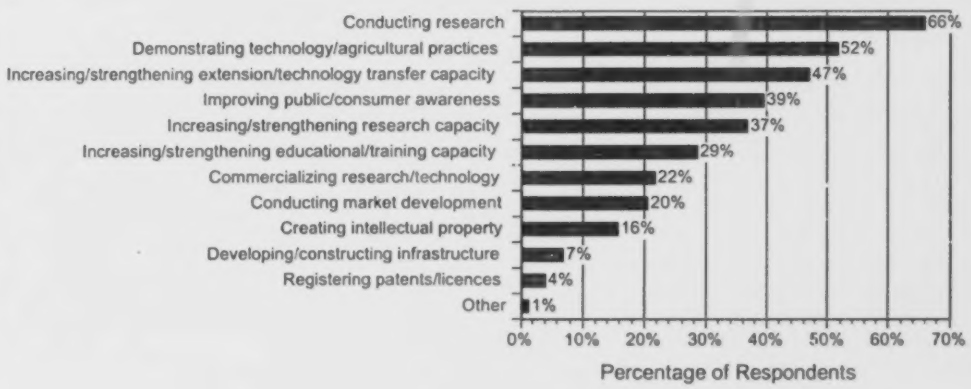
Some 95% of the available AFIF financial resources were allocated to projects that addressed research, development and infrastructure needs.

> Goal #2 To facilitate transition to a more market-driven economy for the Saskatchewan agri-food industry; by enhancing the diversification of the Saskatchewan agri-food industry, supporting research and development in the Saskatchewan agri-food industry; and encouraging Saskatchewan farmers and rural residents to create economic opportunities and jobs.

> Goal #3 To support Saskatchewan's commitment to do its part in meeting Canada's targets in agri-food exports and pursuing a market share of at least 4% of global agriculture and food trade.

Direct investment in the latter two goals was limited to less than 5% of the overall Fund (e.g. specialized livestock marketing, fruit industry development, access to IRAP, etc.). The AFIF Board chose to invest in research, development and infrastructure assuming that improved market potential and greater exports would occur as a spin-off benefit at a later date. Only time will tell if this philosophy will achieve the desired results.

Spending Breakdown by Project Activity



9. *Self-Sustainability is an unrealistic goal for most emerging and developing industry organizations.*

AFIF supported and promoted the creation of several organizations that represent emerging sectors of the agricultural industry. (i.e. Saskatchewan Nutraceutical Network, Western Beef Development Centre, etc.). It takes time to build a financial base, a supportive membership, a menu of programs and services and the ability to generate enough operating capital to maintain an organization. Organizations that represent emerging and developing sectors have not had enough time to establish self-sufficiency.

The AFIF funding principles do not allow for on-going financial support for these developing agencies and organizations.

> *"Funding for infrastructure and institutional development may include start-up capital and initial operations but not commit long-term government funding."*

As a result, the conclusion of AFIF will leave several organizations without on-going financial support. These groups will need to reassess resource options, create new alliances or find funding from other sources, or they will have to cease operations.

10. AFIF used a broad definition of industry when choosing Board representation.

In the Strategic Overview of the AFIF program, the make-up of the Board of Directors is described: "The Agri-Food Innovation Fund is managed by a 12-member Board of Directors with the majority of representation on the Board from industry." By including representation from the University of Saskatchewan as industry representation, a greater focus was placed on a key function of the University - research and development, (AFIF's Goal 1). This reduced the focus on marketing and commercialization, (AFIF's Goals 2 and 3).

Recommendations

The following recommendations flow from the analysis of data collected through the process of final evaluation. The first nine recommendations are applicable to the design and implementation of future programs related to the agriculture and agri-food industry. The last three recommendations are offered to provide immediate direction to the current Board of Directors of the AFIF program.

Recommendations with Potential for Future Action

Recommendation 1:

That in the future, more emphasis and priority should be given to market-driven initiatives designed to support the adaptation of Saskatchewan agriculture toward a more market-driven industry.

Rationale:

AFIF contributed to the overall goal of agricultural adaptation in Saskatchewan. The need for adaptation has grown out of rapid change in the industry – from the production of commodities to the

implementation of the value-chain concept where agricultural producers increase their profitability through diversification, value-adding and commercialization of innovative ideas. Farmers must increase profits though new management, production and marketing practices. Scientific research, development and infrastructure alone will not cause adaptation and change toward a market-driven agricultural sector. There continues to be a strong need for programs and financial resources (e.g. market development, commercialization, etc.) that support the agricultural industry as it moves from a commodity-based sector to a product-based agricultural sector.

Recommendation 2:

That at the commencement of programs such as AFIF, program funding that is targeted at the issues of marketing, value-adding and diversification should more clearly define the terms and outline the types of project initiatives that are expected to advance these objectives.

Rationale:

AFIF chose the philosophy that investment in research, development and infrastructure would result in development of a more market-driven economy over the long-term. It is unclear at this time, whether the AFIF program designers wanted more direct investment in marketing, value-adding and diversification than AFIF actually delivered. The strategy, philosophy and expectations for achieving desired objectives should be clear from the outset of future initiatives.

Recommendation 3:

That in future, funding programs that identify value-adding, marketing and diversification as key objectives, ensure that the composition of the Board of Directors include marketing expertise to foster a link between commercialization and research, development and infrastructure.

Rationale:

The AFIF Board embraced a broad definition of industry, allowing representatives of research institutions to be considered as industry. This decision inevitably resulted in a heavier weighting on research and development projects and a lighter weighting on marketing and commercialization projects. In order for marketing objectives to be vigorously advanced, it is important to ensure that marketing knowledge and expertise is a skill found amongst several Board members.

Recommendation 4:

That a direct linkage between research results and commercialization be encouraged by involving industry representation in the design, application and, wherever feasible, implementation of the program.

Rationale:

In order to maximize the potential for commercialization, it is important to involve industry representation at the program design, application and implementation stages. AFIF successfully included industry at the design stage; however, industry involvement rapidly declined through the application and implementation stages of the program. Industry involvement can be achieved in a number of ways. Industry representatives can form an advisory board, participate in work plan development, contribute to project selection, assist in the design of communication and technology transfer initiatives, etc.

Recommendation 5:

That the overall timeframe for such a program be lengthened in order for effective research, development and infrastructure investments to be made.

Rationale:

The AFIF Program was required to design and implement an investment strategy over a five year timeframe. Five years is a relatively short period of time to create a strategy, select appropriate

long-term investments, implement the strategy and then realize results. In future, research and development programs and the spending of funds could be more effective with a lengthened timeframe to seven to 10 years, or longer. This would allow for careful planning, comprehensive due diligence, leveraging of other funds, project monitoring, responsiveness to emerging issues and time to quantify results and impacts.

Recommendation 6:

That the timeframe provided to allocate resources be extended over the life of the program in order for effective research, development and infrastructure investments to be made.

Rationale:

The AFIF Program allocated the vast majority of the financial resources in the first two years of the program. By doing so, it was not possible to respond to emerging issues and the Board was precluded from building on early program successes. In some cases, due diligence and the sourcing of financial leverage was compromised to facilitate rapid decision-making.

Recommendation 7:

That all infrastructure projects, funded by government programs, complete a comprehensive due diligence process that includes a primary focus on the actual and projected market demand for infrastructure services as well as an overall feasibility of the initiative.

Rationale:

There are several examples of research and development infrastructure, made possible with AFIF financial resources, which are currently operating at very low levels of capacity. In some of these cases, infrastructure managers report that there are not enough clients ready to utilize the services being offered. The market for these services should have been well understood prior to the initial investment. Due diligence must incorporate an assessment of market

demand, service potential and feasibility prior to the investment decision.

Recommendation 8:

That program evaluation be embraced as a management tool and include Board of Director involvement at the design, application and implementation phases of the evaluation.

Rationale:

In order for evaluation to be an effective management tool, the group(s) that will be affected by the results must be included in the process. The AFIF Board improved their involvement in evaluation throughout the life of the AFIF program through participation in the Framework Workshop and through representation on the Evaluation Committee.

Recommendation 9:

That public institutions in Saskatchewan, offering agricultural value-added research, processing and development services, adopt coordinated marketing and promotion programs.

Rationale:

AFIF has contributed to a significant advancement in research and infrastructure development platforms in the province. Potential users of these resources will need to have a good knowledge of the facilities that are available in order to maximize the use of these resources to advance value-added processing. Currently, marketing strategies are not coordinated and many potential clients are unaware of the potential support that is available to them.

Recommendations for Potential for Immediate Action

Recommendation 10:

That selected case study profiles be developed in the future that demonstrate the application of key project success factors.

Rationale:

Lessons for future programs can be learned through the direct experiences of those involved in the AFIF program. These experiences should be documented in two to three years time for the use of policy makers in future development programs.

Factors to be examined could include net value of economic activity, employment generated, role of AFIF administration, costs of development and adaptation of technology, and other contributing factors. Based on current information, areas that could be potential case studies include saskatoon berries, livestock feeds, food processing, seed potatoes and bison.

Recommendation 11:

That the AFIF Board, in conjunction with administration, review expectations and provide management direction for the endowment funds and the research chairs that are currently being administered by the University of Saskatchewan.

Rationale:

Current performance is below expectations in three of five research chair positions. Strategic focus, primary objectives and work plans should be developed by program planners and University officials for each of the positions. Where necessary, revisions should be made to ensure that these positions provide effective outcomes. The role of advisory committees, the use of principle funds, and the impact of administrative overhead should be incorporated into future planning.

Based on our analysis of the characteristics and experience of the more successful chairs, research chairs/endowments are most effective when the following criteria are in place:

- Clearly defined objectives in the governing agreement;
- Good use of advisory committee input;
- Correct expertise relevant to the objectives;
- Continuity in the appointment of the Chair; and
- A linkage to a mature organization for management and support.

Recommendation 12:

That consideration be given to reallocating any remaining Human Resource Program funding to the Food Development Centre.

Rationale:

During the term of AFIF, the Human Resource Development (HRD) Program was delivered to food processing companies although the original mandate included programming for non-food companies and horticultural companies. The HRD Program has fallen far short of its targets and objectives. It is logical to place the responsibility for food processing human resource development within the Food Development Centre where an understanding of the training, development and management needs of food processing companies exists. Housing this program under a separate initiative is a duplication of effort and resources and reduces the effectiveness of the program.

ACKNOWLEDGEMENTS

Garven & Associates would like to thank the AFIF Evaluation Committee, Management Team and the Board of Directors for their guidance and support throughout the evaluation process. The Evaluation Committee has provided valuable input, direction and critical response throughout the project work plan. We have been fortunate to have a great deal of consistency in the Evaluation Committee throughout the life of the AFIF program. This consistency has resulted in a strong connection between the Management Framework, Interim Evaluation and Final Evaluation studies.

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GLOSSARY

AAFC	Agriculture and Agri-Food Canada
ABI	Agricultural Biotechnology Initiative
ADF	Agriculture Development Fund
AFIF	Agri-Food Innovation Fund
AIMS	Agriculture Institute of Management in Saskatchewan
APF	Agricultural Policy Framework
AWB	AgWest Biotech Inc.
BMP	Best Management Practices
CARDS	Canadian Adaptation and Rural Development Fund (Saskatchewan)
CDC	Crop Development Centre
CFI	Canadian Foundation for Innovation
CFIA	Canadian Food Inspection Agency
CWA	Canadian Western Agribition
CWB	Canadian Wheat Board
CWD	Chronic Wasting Disease
FIDC	Food Industry Development Centre
GMO	Genetically Modified Organism
HACCP	Hazard Analysis and Critical Control Points
HRD	Human Resource Development
IRAP	Industrial Research and Assistance Program
MOU	Memorandum of Understanding
NFU	National Farmer's Union
PAMI	Prairie Agricultural Machinery Institute
PBI	Plant Biotechnology Institute

PFRA	Prairie Farm Rehabilitation Administration
PFRC	Prairie Feed Resource Centre
PMRA	Pest Management Regulatory Agency
POS	Protein, Oil and Starch Pilot Plant Corporation
R & D	Research and Development
SAC	Strategic Area Committees
SAFRR	Saskatchewan Agriculture, Food and Rural Revitalization
SFPA	Saskatchewan Food Processors Association
SIAST	Saskatchewan Institute for Applied Sciences and Technology (Kelsey Campus)
SME	Small- and Medium-Sized Enterprises Saskatchewan
SNN	Saskatchewan Nutraceutical Network
SRC	Saskatchewan Research Council
U of S	University of Saskatchewan
USDA	United States Department of Agriculture
WBDC	Western Beef Development Centre
WCVM	Western College of Veterinary Medicine
WGTA	Western Grain Transportation Act
VIDO	Veterinary Infectious Disease Organization

1.0 INTRODUCTION

The Canada-Saskatchewan Agri-Food Innovation Fund (AFIF) was established in 1995 as a unique funding agreement to assist Saskatchewan agriculture as it adapted to unprecedented and rapid change within the industry. The Innovation Fund was created to focus on improvements to Saskatchewan's agricultural infrastructure, to support research and development and to enhance value-added initiatives within the province. Through focusing on the development of emerging primary and value-added agricultural sectors, AFIF resources have been allocated with the goal to advance Saskatchewan agriculture towards a more market-driven economy. In addition, the Innovation Fund was intended to assist those sectors of the agricultural economy that have not traditionally had a significant level of publicly funded research, development and infrastructure support in the past.

1.1 The Structure of AFIF

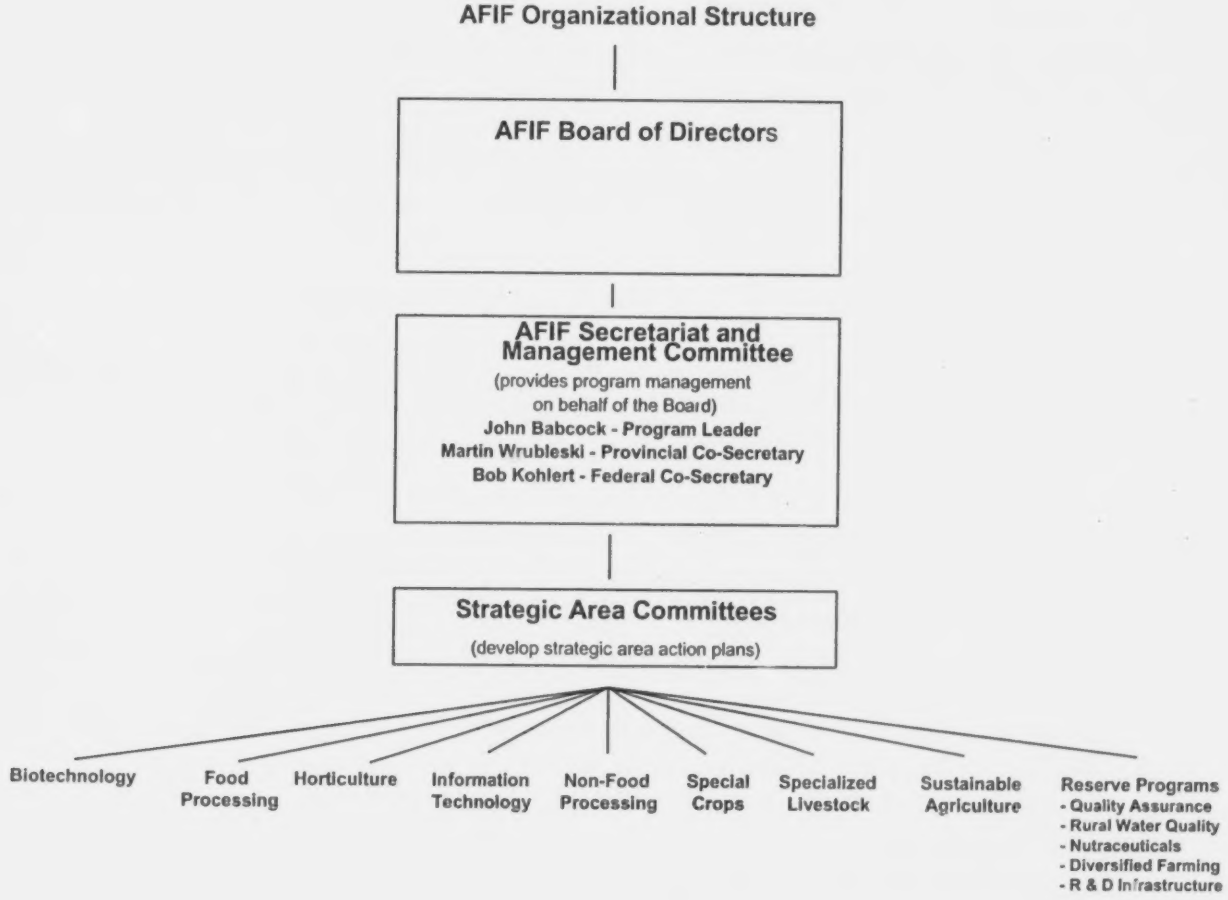
Through the signing of the Interim Safety Net Agreement by the federal and provincial governments in 1995, a new approach to agricultural support programming was established. Rather than funding direct farmer support through programs like the Gross Revenue Insurance Program (GRIP), funds were being made available for a "whole-farm" development initiative. AFIF was part of this whole-farm development approach. With a focus on innovation, AFIF has directed financial resources towards growth and enhancement by supporting infrastructure development, research and value-added initiatives.

AFIF addresses both the federal and provincial government objectives of creating wealth and opportunity for rural Saskatchewan. An underlying objective of the program is to support Saskatchewan agriculture to adapt to change through a movement away from the production of commodities alone to a commitment and philosophy that is based on producing value-added products from agricultural commodities. Farmers must benefit from greater profits by accessing potential opportunity throughout the agricultural value-chain.

1.2 Administrative Structure

Policy direction for AFIF is provided by a twelve member Board of Directors. The Board was to be made up of eight industry representatives, (four appointed by the federal government and four appointed by the provincial government), along with four government representatives (two federal and two provincial). An AFIF

Secretariat was established to administer the AFIF program. The Secretariat operates under direction of the federal and provincial co-chairs however in recent years, the program has been administered primarily under the direction of the provincial co-chair. The Secretariat consists of co-secretaries supported by program area leaders and a limited administrative staff.



1.3 Program Development

During the initial year of the program (1995), a series of board meetings and industry consultations were conducted to determine the overall direction for the AFIF program. Eight strategic areas were identified as a result of these meetings and initial opportunities for future development were discussed within each of the areas.

Figure 1-1. AFIF's Strategic and Reserve Areas

Strategic Areas

Horticulture
Special Crops
Specialized Livestock
Food Processing
Non-Food Processing
Biotechnology
Sustainable Agriculture
Information Technology

Reserve Funded Areas

Nutraceuticals
Diversified Farming Systems
Rural Water Quality
Farm Focused Quality Assurance
Research and Development Infrastructure

In early 1996, the Board of Directors moved to establish Strategic Area Committees. These Committees, made up of industry representatives and subject area specialists from both federal and provincial governments, were tasked with the responsibility to create a strategic response which would propel specific areas of agriculture into the future through research, development and infrastructure advances. Strategic working groups were then created to establish work plans designed to transform the strategy into practical project activity. Work plans were designed to address opportunities and to overcome identified constraints within each of the strategic areas. These work plans were presented to the Board for modification and approval.

Once the general direction and work plan for a strategic area was approved by the Board, funding applications were requested. In some cases, applications came as a result of a call for proposals. In other cases, specific organizations were approached to develop project applications supporting the goals of the strategic area. Interested and qualified parties, who had projects and initiatives that could

advance the objectives of the strategic area, were selected by the Strategic Working Groups. Each of the Working Groups prepared formal selection criteria to assist them in their project selection process.

Recommendations for funding approval were submitted to the Board of Directors. The Board considered all funding applications in relation to the overall objectives and goals of the AFIF program. All funding decisions were reviewed and approved by the Board of Directors. Specific funding principles were adhered to within the AFIF program as follows:

- Agreement Funding shall not be available to commercial enterprises for the purchase, construction or expansion of buildings and normally available equipment;
- Agreement Funding shall not be used to subsidize the ongoing operations of commercial enterprises;
- Pilot activities, testing, training, trials, scale-up, product development or similar activities by commercial enterprises shall be eligible for consideration;
- Funding priority will be given to research and development projects that target specific needs in Strategic Priority Areas and are results oriented;
- Funding priority shall be given to those activities that benefit a Strategic Priority Area in general as opposed to specific individuals or firms;
- Funding for infrastructure and institutional development may include start-up capital and initial operations but not commit long-term government funding;
- Priority shall be given to projects with industry involvement through direct or in-kind support, obtained prior to support being sought from the Fund.

As a result of their analysis of funding requests and development needs, the Board was able to identify gaps which were not being fully addressed within the eight Strategic Areas. Several additional development opportunities emerged. The Board recognized the research and development needs of these additional areas through Reserve Funding.

Existing strategic working groups and program managers were asked to support the selection process and the administration of the Reserve Funded areas of the program. Work plan development and project administration has been managed within the federal and provincial governments without the creation of specific Strategic Area Committees.

1.4 Saskatchewan's Agricultural Industry in Transition

1.4.1 Pre-AFIF Situation (1990 – 1995)

AFIF was created in response to an ongoing need in Saskatchewan to strengthen profitability in Saskatchewan's agriculture sector. The U.S. farm bill (1990), as well as EU subsidies, weak demand in less developed economies and increased yields from science and technology, had caused a decline in world commodity prices for cereal grains and oilseeds.[1] Saskatchewan's farm economy was economically depressed because of low commodity prices. A prescription to improving the health of the farm economy centered on creation of more diversified farm operations, greater emphasis on value-added processing and exports and increased emphasis on marketing, as a means to restore economic viability to the agricultural economy.

In addition to low commodity prices, the impact of the elimination of the Western Grain Transportation Act (WGTA) transportation subsidy in 1995 was forecast to cause dramatic changes in the economies of farming and the type of farm products produced in Saskatchewan.

In response to these conditions, policy makers therefore designed the AFIF program to provide financial resources to address three major objectives for AFIF.

1. To support the development of emerging primary and value added agriculture sectors in Saskatchewan by providing assistance for research, development and infrastructure needs.

2. To facilitate transition to a more market driven economy for the Saskatchewan Agri-Food industry; by enhancing the diversification of the Saskatchewan Agri-Food industry, supporting research and development in the Saskatchewan agri-food industry; and encouraging Saskatchewan farmers and rural residents to create economic opportunities and jobs.

[1] Agriculture and Agri-Food Canada, Competition and Subsidies in Global Markets, March 2002. www.agr.gc.ca/cb/apf/bdg_comp.

3. To support Saskatchewan's commitment to do its part in meeting Canada's targets in agri-food exports and pursuing a market share of at least 4% of global agriculture and food trade.

1.4.2 Changes and Conditions During the AFIF Period (1996 – 2003)

During the implementation of AFIF, Saskatchewan's agriculture industry experienced a number of noteworthy changes and developments. These changes put into context the external environment faced by the agricultural sector and the program during AFIF's implementation period.

The Canadian dollar declined in value compared to the U.S. dollar ($0.73 to $0.63 - $0.64 range) and prime business borrowing interest rates declined from an average level of 7.5% to 4%. Both the Canadian dollar and borrowing rates were at all time record lows. These developments increased the competitiveness of agricultural exports and made borrowed capital less expensive than in recent time periods.

Other forces weighed heavily on the farm economy. The U.S. farm bill was renewed in 1996 and continued to depress commodity prices for cereals and oilseeds. The elimination of WGTA transportation subsidy also contributed to lower net farm income from grains and oilseeds production.

Saskatchewan's agriculture industry changed significantly during the AFIF implementation period.[2,3]

1. Number of dedicated wheat farms was reduced in half (35.9% to 18.1%)
2. Increase in production of pulse, specialty, forage crops and livestock.
3. Decline in net farm income by 62% and increase in operating expenses by 13.6%.
4. Decline of 24% in total agricultural exports associated with a decline in crop exports; exports of semi-processed products (e.g. malt, feeds, etc.) remained steady while processed food exports increased by 125%.
5. Decline of number of farms by 11%.

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[2] Government of Saskatchewan, Report to Premiers: A Fair Deal for Canadian Farmers, Regina, October 2001, p.4.
[3] Office of Chief Economist, USDA, USDA Agricultural Baseline Projections to 2009, Washington, February 2000.

6. Overall increase in total food and beverage shipments by 59%.

7. Increase in public concern about the health and safety of Genetically Modified Organisms (GMOs).

Of special importance were continued high levels of agricultural support under U.S. farm legislation that produced trade distorting impacts during the period of AFIF.[4] For example, effective price guarantees in the U.S. were well above crop production costs for corn, wheat and soybeans in the form of direct payments averaging US $5.0 billion annually and ad hoc emergency income support payments averaging US $7.0 billion annually.[5] These payments provided strong incentives to U.S. farmers to continue increasing investment and output that further weakened international grains and oilseed prices. At the same time, federal and provincial governments provided some 50% less farm income support in Saskatchewan during the early years of AFIF compared to the pre-AFIF period (e.g. $761 million for 1992-94; average of 351 million for 195-99). Program payments now and increased during 2000-02 to pre-AFIF levels, due to drought.

Under the 2002 farm bill, U.S. farmers are shielded from the need to adjust production in response to weaker prices – Canadian farmers are not shielded. "The adjustment burden falls especially on grains and oilseeds farmers in Latin America, Canada, Australia and Africa who face lower world prices and reduced profitability, and who receive little additional assistance from their governments."[6]

Saskatchewan farmers have responded by reducing grain production and increasing production of pulses, other specialty crops and forages, in conjunction with cattle. Farmers adopted different crop production practices that utilized innovative crop rotations, minimum tillage practices and reduced summer fallow. The 1996 U.S. farm bill impacted negatively on traditional grains and oilseeds production levels but indirectly contributed to attainment of a more diversified agricultural industry in Saskatchewan.

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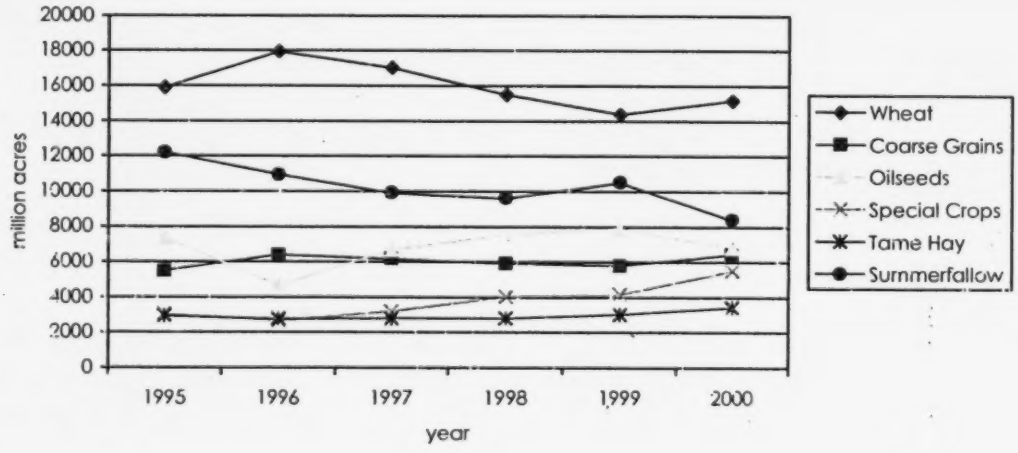
[4] Government of Saskatchewan, Report to Premiers: A Fair Deal for Canadian Farmers, Regina, October 2001, p. 4.

[5] Office of Chief Economist, USDA, USDA Agricultural Baseline Projections to 2009, Washington, February 2000.

[6] Penn, J. B., Senior Vice President and Washington Office Manager of Sparks Companies, Inc., Agriculture Policy Discussion Paper, Washington, January 2001.

The 2001 Census of Agriculture[7] reveals several changes related to farm size, land-use, production and farm type. Saskatchewan continued in 2001 to have the largest farms in Canada, averaging 1,283 acres, and the largest portion (i.e., 64.9 million acres or nearly 40%) of all agricultural land in Canada. Saskatchewan crop land increased by 6.8% from 1996 to 38.0 million acres, accounting for 42% of all crop land in Canada. The increase in crop land area was a result of a 29.3% decline in summer fallow area to 7.7 million acres.

Figure 1-2. Agricultural Land Use, Saskatchewan, 1995 to 2000



Source: Agricultural Statistics, SAFRR

Changes in cropping patterns included a reduction in total wheat area[8] as illustrated by Figure 1-2 and in the proportion of farms classed as wheat farms. For example, wheat area declined 16.4% from 1996 to 15.2 million acres in 2001. Some 18.1% of farms were classed as wheat farms in 2001 compared with 35.9% in 1996. However, wheat is still the largest crop, utilizing about 40% of total field crop area in the province. In 2001, grain and oilseed farms accounted for 43.5% of farms, followed by cattle farms with 24.3%.[9]

[7] Statistics Canada, 2001 Census of Agriculture, Saskatchewan Release, Ottawa, May 2002. www statcan.ca/english/agcensus2001/first/regions/farmsk.htm
[8] Saskatchewan Agriculture Food and Rural Revitalization, Agricultural Statistics Handbook, Regina.
[9] Statistics Canada op cit.

A decline in wheat profitability led to a decline in wheat area resulting in a shift to larger land areas devoted to pulse, specialty and forage crops. Oilseed crops area has fluctuated. Dramatic change occurred in some areas such as acreage of dry field pea and lentils where acres more than doubled between 1996 and 2001 and chickpeas, which increased to over 1.0 million acres from almost nil in 1996. Another highlight was saskatoon berry acreage that doubled from 1996 to 916 acres in 2001, small in total, but significant for the industry.

The foregoing land-use and production shifts are considered, in part to be due to the following factors:

- lower profitability of traditional wheat and cereal crops resulting from:

  i. elimination of the federal WGTA transportation subsidy in 1995 (i.e., higher transportation costs); and

  ii. lower commodity prices due to higher subsidies under the U. S. farm bill and other factors;

- stronger market opportunities and higher prices for pulse crops, hogs, beef and sheep; and,

- previously unrealized production and market opportunities for less traditional forms of livestock, horticulture and field crops, fostered, in part, with AFIF support for research, development, extension and innovation.

Saskatchewan farm numbers declined by 11.2% between 1996 and 2001 to 50,598, slightly higher than the rate of decline of 10.7% for all Canadian farms. The decline in farm numbers between the two census periods is consistent with the decline experienced over the past fifty years, due to technology changes and increasing productivity. At the same time, Saskatchewan farm numbers represented 20% of total Canadian farm numbers, virtually unchanged from 1996.

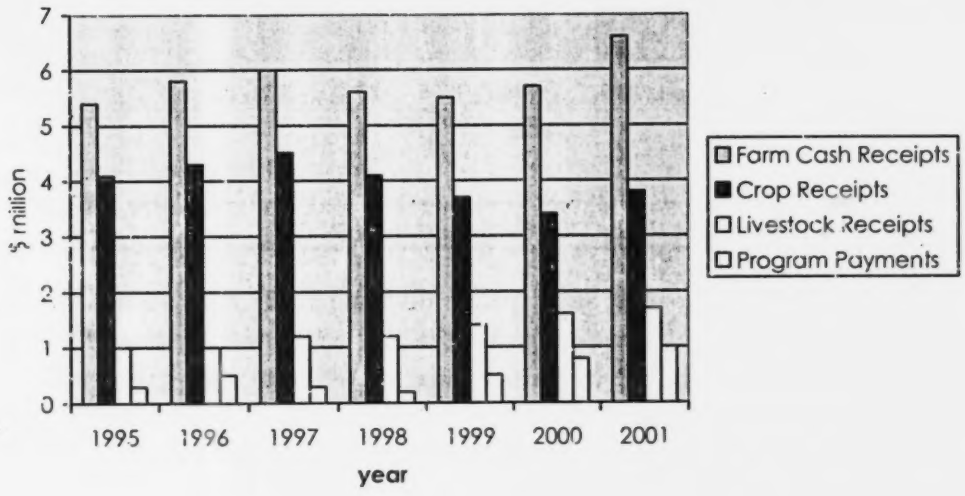
During the AFIF program period, the number of farms with less than $100,000 of gross farm receipts fell by 24.0%, while the number of farms with $100,000 or more of farm cash receipts increased by 28.7%. This latter group of 17,777 larger farms represented 35% of the farms in Saskatchewan but accounted for almost 80% of total farm cash receipts.

Total provincial farm cash receipts increased from $5.6 billion in 1995 to $5.9 billion in 2000, while farm operating expenses (excluding depreciation) increased

from $4.4 billion to $5.0 billion (census year data for receipts and expenditures are for the previous year). Farm operating expenses grew 13.6% in total between the two census years, faster than farm receipts that grew 5.4%.

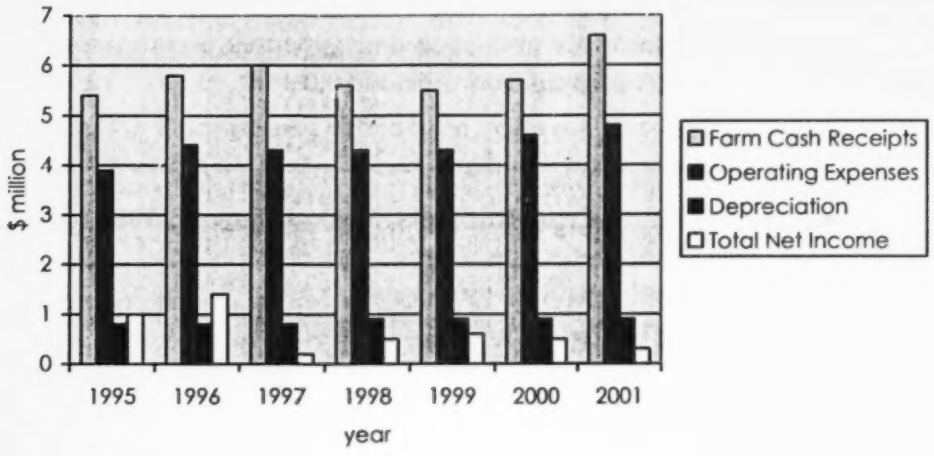
Figure 1-3 illustrates that crop receipts declined during the period of AFIF while livestock receipts and program payments steadily increased. Figure 1-4 shows increases in farm cash receipts and operating expenses accompanied by a steady decline of 62% in total net income from 1996 to 2001.

Figure 1-3. Farm Cash Receipts, Saskatchewan, 1995 to 2001



Source: Agricultural Statistics, SAFRR; Statistics Canada 21-603

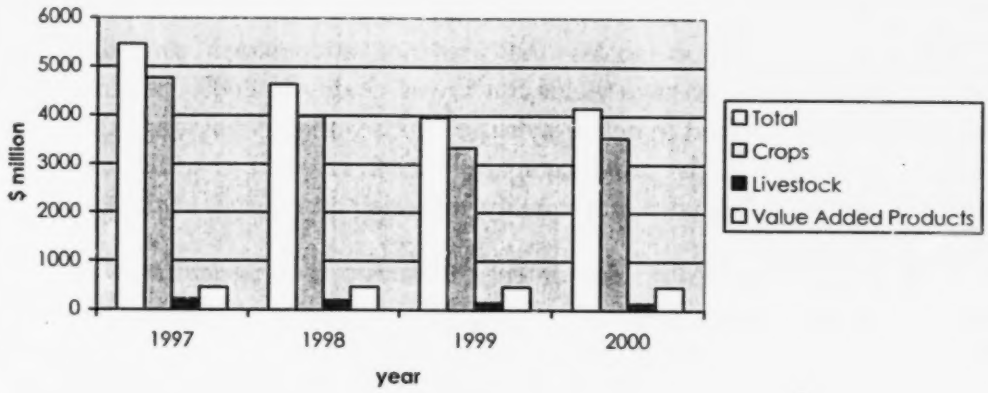
Figure 1-4. Income of Farm Operators, Saskatchewan, 1995 to 2001



Source: Agricultural Statistics, SAFRR; Statistics Canada 21-603

Over the period, farm product prices declined by 27.2% while farm input prices increased by 8.5%, resulting in a continuing cost-price squeeze. Saskatchewan farmers experienced tighter operating margins with the ratio of operating expenses to gross farm receipts increasing to 0.85:1 in 2000 from 0.77:1 in 1995.

Figure 1-5. Agricultural Exports from Saskatchewan, 1997 to 2000



Source: Agricultural Statistics, SAFRR

Agricultural exports from Saskatchewan declined over the period of AFIF, although they continued to be a major source of income for Saskatchewan producers. Total agricultural exports declined by 24% from $5.5 billion in 1997 to $4.2 billion in 2000. As illustrated in Figure 1-5, exports of both primary crops and livestock declined. Exports of value-added semi-processed plant (e.g. mallet, feed, etc.) and animal products declined slightly, offset by increases in exports of processed food and beverages. This shift in composition of exports to higher-valued products is similar for all of Canada, although Saskatchewan expects a much smaller proportion in value-added form.[10]

The worsening farm economic situation was aggravated by highly variable weather conditions over the period, with differential impacts on production across various areas of the province. Throughout the period, disease affected pulse crops, particularly chickpeas, to some extent and Chronic Wasting Disease (CWD) became a severe problem for the emerging elk sector.

In 1996 and 1997, Saskatchewan crop yields were average or better and prices strong due to weather induced production shortfalls in other countries. A province-wide spring drought was experienced in 1998 followed by timely rains that resulted

[10] Agriculture and Agri-Fod Canada, Overview of the Canadian Agriculture and Agri-Food Sector, Ottawa, February 2002. www.agr.gc.ca/cb/apf/bgd_overview

in above average crop yields and quality. However, prices declined with increased global output due to trade distorting subsidies and more normal weather conditions. Dry conditions were experienced in western areas of the province and excess moisture in eastern areas during 1999. Cool wet weather contributed to disease and quality problems but above average yields.

Variable precipitation across the province and excess rain during harvest contributed to above average yields but lower quality in 2000. Severe, widespread drought in 2001 resulted in below average yields but above average quality. Severe drought over much of the province again in 2002, resulted in additional crop losses. Rain during harvest reduced crop quality, although crop prices improved. [11] [12]

It is evident that AFIF investments in support of agricultural diversification objectives were consistent with the underlying directions of change in economic and market factors affecting Saskatchewan agriculture. New diversification opportunities in many of the strategic areas were enhanced through AFIF programming.

[11] Saskatchewan Agriculture, Food and Rural Revitalization, Annual Reports, 1997-98 to 2000-01, Regina.

[12] Saskatchewan Agriculture, Food and Rural Revitalization, Crop Reports, 1997 to 2002, Regina.

2.0 PROGRAM EVALUATION

As AFIF concludes it is timely to consider whether the program's goals and objectives have been met or have the potential to be met in the future. Final evaluation projects focus on issues related to the measurement of outcomes. This final evaluation project has been designed to determine whether AFIF has been effective in achieving program objectives as well as to determine whether positive impacts have been achieved through the investments made by the program.

2.1 Purpose of the Final Evaluation

The primary purpose for final or summative evaluation is to provide program managers with a mechanism to address the design and delivery considerations of future programs. Another key purpose of a final evaluation project is to determine whether the investments made have resulted in the desired impacts. Therefore, the purpose of this study has been to:

- Assess the effectiveness and impacts of AFIF;
- Identify key findings and the lessons learned through program implementation; and to
- Present recommendations for consideration in future agricultural development programs

It is very early to accurately determine the effectiveness and impact of all of the AFIF project investments, particularly since the majority of the investments are research, development and infrastructure related initiatives. These types of investments typically take a longer period of time to affect the target audiences and to provide measurable results. However, wherever possible, Garven & Associates has tried to identify preliminary impacts and have identified where future impact may be expected.

2.2 Evaluation Principals

A good quality evaluation study is designed to be used as a management and strategic planning tool. For final evaluation projects, the focus of the effort is specific

to the impacts and measurable outcomes that result from a program's implementation. Final evaluation data collection and measurement procedures are intended to collect data that are relevant to both program purpose and program accomplishments.

In general, the following questions are posed at final evaluation:

- Was there a strong rationale for the program's operation and implementation evident throughout the life of the program?
- Were resources (financial and human) efficiently and effectively used to support the achievement of program objectives?
- What are the impacts and outcomes of the program?
- Did the program meet its stated objectives?
- Did the program have spin-off benefits or unintended impacts?
- Was the program responsive to the necessary changes that were requested as a result of the interim program evaluation study?
- Did each of the AFIF program components (eight Strategic Areas) contribute to the overall objectives of the program?
- Were Saskatchewan communities and program stakeholders satisfied that AFIF assisted them to achieve their goals and objectives?

Strategies to improve and influence the development and administration of future like-minded programs can be identified through a thorough assessment of the program's rationale, efficiency, effectiveness, impacts and linkages. It is the responsibility of the evaluation consultant, in cooperation with the evaluation committee, to address evaluation issues that have been identified within the Program's Evaluation Framework.

An evaluation study typically uses the following steps:

1. the collection of information required to answer the evaluation questions specified in the terms of reference or in the evaluation framework;

2. the preparation of the information collected into a format suitable for future analysis;

3. the analysis of the information;

4. the formulation of conclusions which relate to the evaluation questions asked;

5. the formulation of recommendations for decision-making or action; and

6. the communication of the evaluation findings to the program administrators and other interested parties.

When conducting evaluation studies, Garven & Associates adheres to the principles and guidelines established by the Treasury Board of Canada.[13] By following these common principles, a useful and practical evaluation can be completed which will provide important feedback to the program administrators.

2.3 Evaluation Terminology

When conducting evaluation, there are several terms that are commonly used. Some of the terms that are used throughout this document are included here for the reader's reference.[14]

Program Resources	Identification of both the human and financial resources that are used to achieve the goals and objectives of the program.
Program Objectives	The specific objectives for the area which are identified within the planning documents. Something towards which effort is directed; all of the program activities are designed to address these objectives.
Reach	The individuals and organizations targeted and directly affected by a program, policy, etc.
Short Term Results	Short Term Results refer to project outputs and outcomes that should be expected within the first three years of the

[13] www.tbs-sct.gc.ca/index_e.asp
[14] Ibid.

program. A result is the end purpose for which a program or activity is performed. Result is a general term that often includes both outputs produced and outcomes achieved by a given organization, program, etc.

Long Term Results — Long Term Results refer to project results that are expected after five years of the program.

Outcomes — An external consequence attributed to an organization, program, etc. that is considered to be significant in relation to its commitments. Outcomes may be described as: immediate, intermediate, or final, direct or indirect, intended or unintended.

Output — Direct products or services produced through program activities and delivered to a target group or population.

Program Activities — Reference to an operation or work process conducted by an organization, intended to produce specific outputs. Activities are the primary link in the chain through which results are achieved.

Indicators — A statistical or parameter that provides information on trends in the condition of a phenomenon and has significance extending beyond that associated with the properties of the statistic itself.

Performance Measure — An indicator that provides information (either qualitative or quantitative) on the extent to which a program, policy or initiative is achieving its results.

Data Sources — Data sources (files, surveys, interviews, etc.) will be used by the evaluator to assist in the collection of data to address each of the evaluation issues that have been posed.

2.4 Our Approach to the AFIF Final Evaluation

Our approach to the final evaluation of AFIF has involved several inter-connected steps of research, consultation and feedback. The process involved working closely

with the Evaluation Committee through a series of meetings at which we shared the results of our research and findings as the evaluation proceeded. A critical and final step was the presentation of research findings and recommendations to the AFIF Board of Directors for response and feedback.

Evaluation Methodology and Activities

The evaluation methodology implemented for the final evaluation involved the following key activities:

1. Evaluation Framework Workshop

In response to the mid-term evaluation, the AFIF Board and administration convened an evaluation workshop to revisit the targets and indicators for each of the eight strategic areas. This workshop was conducted in October, 2001. Board members, AFIF stakeholders, strategic area managers and project managers were asked to participate.

As a result of the workshop, the Evaluation Framework was updated and refined to more accurately reflect the actual goals and implementation strategies that were used within the AFIF program. Workshop participants also identified measures of success and suggested ways to collect data that would document the program's ability to meet its targets and objectives.

This process was a necessary step in preparation for the final evaluation as the refined evaluation questions have been used as the basis of the final evaluation assessment.

2. File/Document Review

The file document and review process built on the extensive review of files and documents undertaken during the interim evaluation of the AFIF program. The file review activities included in the final evaluation consisted of the following activities.

- A review of selected files and relevant documents
- A collection and review of external data sources
- A broad-based literature review to identify trends and sector status.

3. Survey of Project Proponents

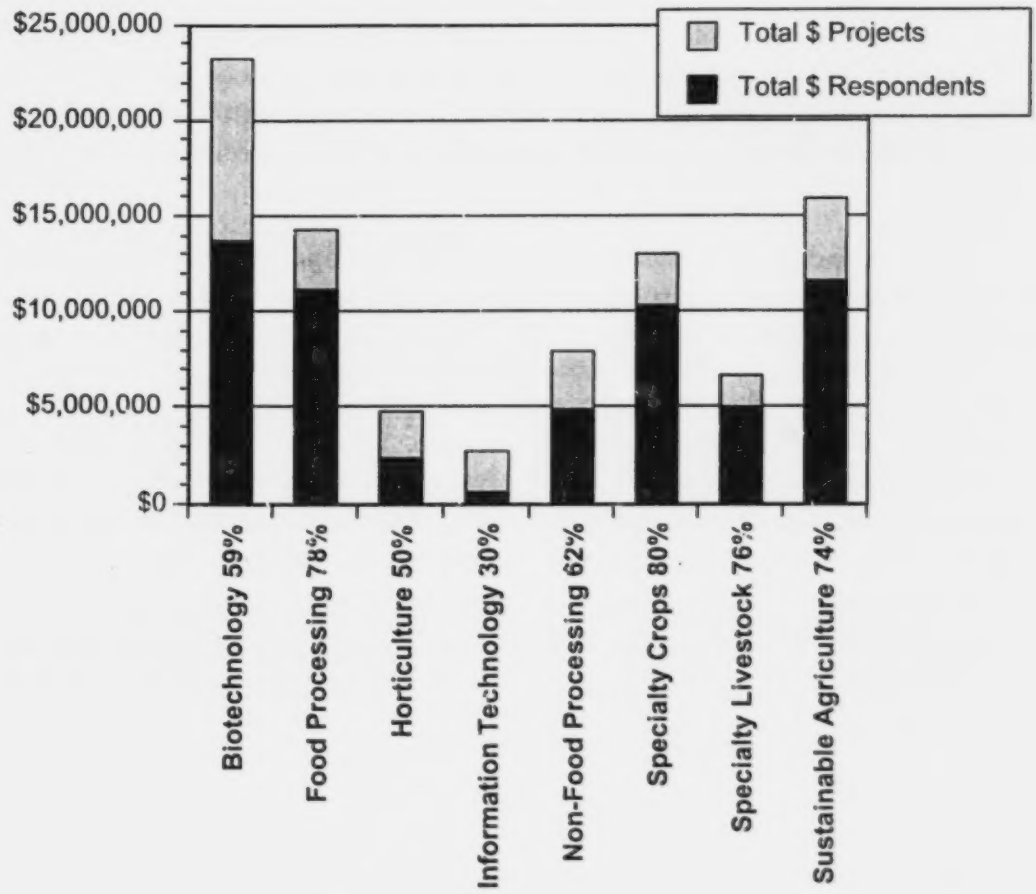
A broad-based survey was designed and implemented for completion by individuals representing projects that received AFIF financial resources. A copy of the survey is appended to this report as Appendix A.

The survey was mailed to managers of 282 AFIF-funded projects in April 2002. Completed survey responses were received for 150 projects, representing a 53 % response rate in terms of project numbers. The surveys returned represent $60.2 million of the financial resources allocated or two-thirds of the total AFIF of $91 million.

The proportion of projects in dollar terms, compared with the value of AFIF funds for each strategic area, are illustrated by Figure 2-1.

The evaluation model used by Garven & Associates provided a framework for assessment of several economic and environmental impacts. The survey yielded sufficient data to measure several economic impacts to date. We tried to use economic tools (e.g., benefit-cost analysis, return on investment) to assess the aggregate benefits of AFIF but found that it was too early for respondents to provide god quality data on future impacts of projects. Such analyses are better suited for case studies in the future.

Figure 2-1. Survey Response Rates by Strategic Area



4. Key Informant Interviews

Interview guides were prepared and one-on-one interviews were conducted, either in-person or on the telephone, with a cross section of AFIF Board members, administrators, program managers, agricultural stakeholders, project proponents , fund recipients as well as with infrastructure users and clients. A total of 90 interviews were completed. The purpose of the interviews was to obtain information from informed individuals who had knowledge about various aspects of AFIF.

5. Literature Review

In order to provide a context for the results of the AFIF program, a literature review was completed. The goal of the literature review was to source statistical data and relevant research studies that could describe the growth and development of the Saskatchewan agricultural industry during the period of the AFIF program. In addition, it is important to document influencing factors that have that have affected the program's ability to reach its goals and targets. Therefore, information was collected on the influencing factors in each of the eight Strategic Areas as well as information relevant to the overall agricultural industry in Saskatchewan.

6. Data Synthesis and Analysis

All of the data collected through the survey, interviews, file reviews and literature study have been synthesized in order to address the evaluation questions posed in the AFIF Evaluation Framework. As a result of this analysis, a series of conclusions and program recommendations have been developed. The final report reflects a synthesis of what was heard from individuals in the interviews and survey.

3.0 BIOTECHNOLOGY STRATEGIC AREA

3.1 Strategic Area Description

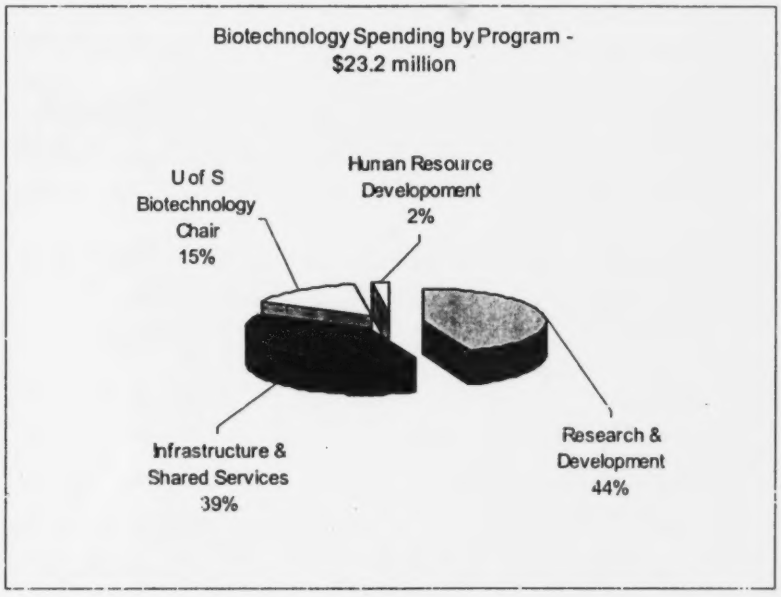
Vision: Agriculture biotechnology will contribute to the development and transfer of agricultural technologies resulting in economic opportunities and activities that enhance the sustainability of Saskatchewan farms and communities. Agriculture biotechnology activities will contribute to the creation and growth of competitive value-added Saskatchewan industries including the manufacturing of agricultural biotechnology products, and their marketing worldwide.

Figure 3-1. Biotechnology Objectives

- Support research projects leading to the development of enabling biotechnologies for the benefit of the agriculture and agri-food industries.
- Support the development or application of proprietary or non-proprietary biotechnology products. The target clients were Saskatchewan public and private research institutions.
- Finance construction and/or purchase of accessible biotech facilities and equipment (i.e., infrastructure) that will directly facilitate the successful completion of biotechnology research and demonstration.
- Support biotechnology public awareness activities.
- Support biotech regulatory process access and harmonization.
- Enhance biotechnological and business competencies of Sask. Graduates.

A total of $23.2 million for 31 projects was approved in the agricultural biotechnology area. These projects were distributed among four initiatives as illustrated in Figure 3-2.

Figure 3-2. Biotechnology Expenditures by Program



3.2 Strategic Area Components

3.2.1 Research and Development

The objectives of this initiative were:

- to support research projects leading to the development of enabling biotechnologies for the benefit of the agriculture and agri-food industries; and,
- to support the development or application of proprietary or non-proprietary biotechnology products. The target clients were Saskatchewan public and private research institutions.

A public call for letters of intent to complete research and development projects was issued closing January 31, 1997. A total of 62 letters were received requesting $46.3 million. The proposals were screened using a numerical evaluation system. Six proposals identified as having significant potential limitations imposed by patents or

intellectual property rights were subjected to a formal "freedom to operate" assessment, to determine if the proposed work infringed on any existing patents.

Project proponents selected during the initial screening were invited to submit a detailed proposal that was reviewed and rated by the Strategic Area Committee (SAC) prior to submission to the AFIF Board. A total of sixteen (16) biotechnology research and development projects were approved totaling $10.2 million.

3.2.2 *Infrastructure and Shared Services*

The overall objective for projects selected within Infrastructure and Shared Services were:

- to finance construction and/or purchase of accessible facilities and equipment (i.e., infrastructure) that will directly facilitate the successful completion of biotechnology research and demonstration;
- to support biotechnology public awareness activities;
- to support and facilitate industry access to biotechnology regulatory processes; and,
- to support and facilitate biotechnology regulatory harmonization. The potential clients were Saskatchewan research and training institutions and the biotechnology industry.

A public call for letters of intent to complete projects providing agriculture biotechnology infrastructure and services was issued closing September 30, 1996. Ag-West Biotech (AWB) Inc. was invited to submit proposals related to public awareness and regulatory support/harmonization.

A total of twenty (20) letters were received requesting $23.7 million for infrastructure investments. The proposals were screened using a numerical evaluation system. Project proponents selected during the initial screening were invited to submit a detailed proposal that was reviewed and rated by the Strategic Working Group prior to submission to the AFIF Board.

A total of nine (9) biotechnology infrastructure projects were approved totaling $8.2 million (including the use of $3.3 million of reserve funds). An additional

$800,000 was approved for 3 projects covering the activities conducted by AWB, for a total of $9.0 million on infrastructure and shared services.

3.2.3 Human Resource Development

The University of Saskatchewan and the Saskatchewan (U of S) Institute of Applied Sciences and Technology (SIAST) Kelsey Campus were invited to submit proposals related to biotechnology human resource development. The objective of this initiative was:

- to enhance the biotechnological and business competencies of Saskatchewan graduates from university and technical school.

The target beneficiaries were Saskatchewan training institutions, biotechnology undergraduates and graduate students, the biotechnology labour force and biotechnology companies. A total of $4.0 million was earmarked for biotechnology human resource development. Of this amount, $3.5 million went to the College of Agriculture, U of S, as an endowment for a biotechnology laboratory, a biotechnology chair and an industry-focused training program, while the remaining $0.5 million went to SIAST Kelsey Campus for facilities and equipment to enhance technical training in biotechnology.

3.3 Strategic Area Status and Influencing Factors

Debate over GMOs dominated the agricultural biotechnology scene during the latter years of AFIF implementation. Prior to intensification of GMO fears, biotechnology was viewed in the early phase of AFIF as an area of opportunity for public and private research and innovation. Optimism in the Canadian biotechnology community about the prospects for development of new technologies, products and patents was a driving force underlying AFIF investments in research and development, and infrastructure.

Emerging public concerns about health and safety issues with GMO's and several high profile court cases involving GMO issues contributed to growing caution in the Saskatchewan research and development community. Some consumers are seeking GM-free products and labeling as a means of distinguishing GMO containing

products. McCain Foods Vice President Mark McCauley recently advised that the company would respond to consumer calls by committing to use only GM-free potatoes in production of frozen french fries.[15]

Several producer groups expressed concerns about continued Research and Development (R&D) involving GM technologies. Concerns expressed by pulse crop growers caused re-direction of work on several AFIF-funded projects. National Farmers' Union (NFU) board member Stewart Wells indicated that the organization supports a Saskatchewan Organic Directorate class action lawsuit seeking compensation for losses resulting from introduction of GM canola and an injunction against introduction of GM wheat.[16]

A key issue that will determine the future of biotechnology R&D in the province is quickly coming to a head – the issue of GM-wheat. Monsanto spokesperson Trish Jordan recently advised that the company had now made its full submission on Roundup Ready wheat to federal regulatory agencies, Pest Management Regulatory Agency (PMRA) and Canadian Food Inspection Agency (CFIA.)[17] Meanwhile the Canadian Wheat Board (CWB) is pursuing avenues on behalf of producers for blocking GM-wheat and for having market impacts included as part of the decision processes. Recent U of S studies, demonstrated that market and economic impacts of GM-wheat would be negative for Saskatchewan producers, unless international customers and competitors also approved of GM-wheat.

The GMO controversy was a key factor in slowing the pace of public and private biotechnology development within the province during the latter phase of AFIF. While AFIF programming moved the biotechnology strategic area in Saskatchewan to a new level of R&D expertise and capacity, results, in terms of new products and patents were not as great as initially envisaged by stakeholders.

Several external factors and constraints influenced the outcome of AFIF expenditures on biotechnology initiatives. These factors included the following:

- Growing public concern regarding the safety of GMO's contributed to a slower pace of public and private biotechnology research and development than anticipated.

[15] McCauley, M., "McCain Responds to Anti-GMO View", The Western Producer, Saskatoon, August 17, 2000.

[16] Wells, S., "NFU Opposes GM Canola", The Western Producer, October 25, 2001.

[17] Jordan, T., "Roundup Ready Wheat Takes First Step Toward Approval", The Western Producer, January 9, 2003.

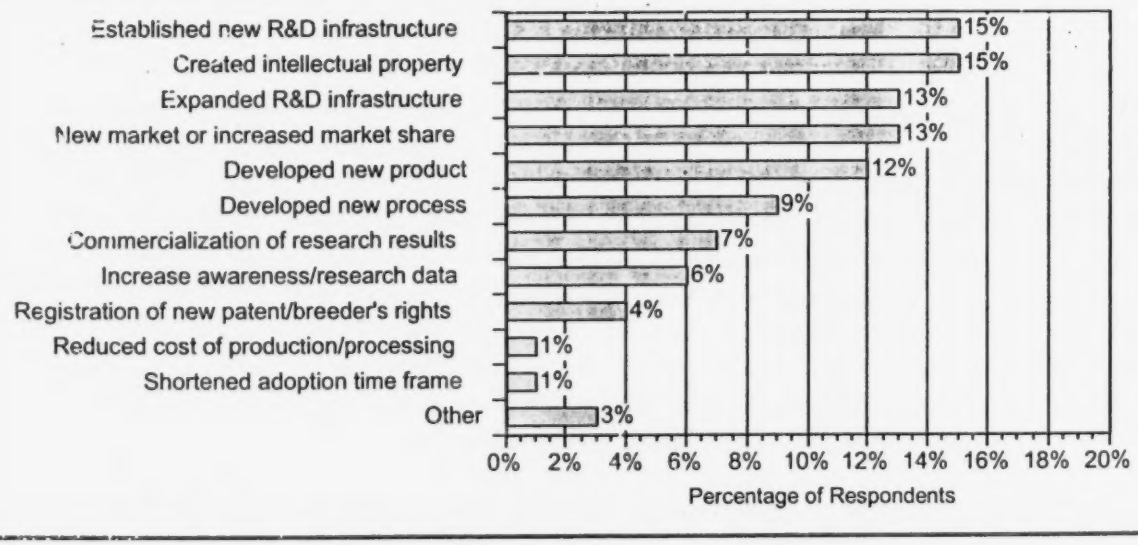
- Business consolidations by international agricultural chemical companies resulted in transfer of some biotechnology expertise out of Saskatchewan.

- Development and commercialisation of proprietary biotechnology products were limited by one of AFIF's funding principles that prohibited support benefiting commercial enterprises or individual firms.

3.4 Project Outputs

Based on a broad-based survey of project managers, the main outputs of AFIF biotechnology investments, in order of priority, were new and/or expanded R & D infrastructure; creation of intellectual property; new markets, products and processes; commercialization of research results and awareness. These key outputs are illustrated in Figure 3-3.

Figure 3-3. Biotechnology Outputs



3.5 Accomplishments and Results

Key accomplishments and results of AFIF investment in biotechnology research, infrastructure and human resource development are as follows:

1. Research & Infrastructure Investments

- Saskatoon's position as a leader in agricultural biotechnology has been enhanced (e.g., AWB, Plant Biotechnology Institute (PBI) Wing, Veterinary Infectious Disease Organization (VIDO), etc.).

- AFIF research and infrastructure investments during the 1997-99 period helped to position Saskatchewan institutions to more effectively access subsequent federal funding sources (e.g., U of S & VIDO funds from Genome Canada, Canadian Foundation for Innovation (CFI) funds, tri-council funding, etc.) for biotechnology research projects.

- AFIF helped to strengthen informal alliances within the Saskatchewan agricultural biotechnology community and to foster a collaborative approach to future projects.

2. Human Resource Development

- SIAST produces 20 new biotechnology technicians annually; all are quickly employed by public & private institutions, primarily within Saskatoon. Facilities could handle up to 30 graduates annually however it is reported that inadequate high school science preparation is a limiting enrolment factor.

- With respect to the U of S biotechnology endowment, leveraging of funds from other sources has been minimal, to date.

- The existing Biotechnology Chair provides supervision for post-graduate students. To date one biotechnology graduate has emerged.

- The Agricultural Biotechnology Initiative (ABI) component of the U of S endowment has developed and delivered biotechnology and business oriented professional development short courses; initial courses were popular but indications are that interest may be declining; some rethinking of priorities may be needed in the future.

- Biotechnology laboratory facilities for student education have been provided.

3.6 Responses to Long-Term Framework Questions

1. Has the Agri-Food Innovation Fund contributed to the development of public and private sector intellectual property and biotech products? Has this development contributed to strengthened alliances?

Data from the survey of project managers and stakeholder interviews confirmed that AFIF has contributed to the development of public and private intellectual property and biotechnology products. Examples of projects contributing to development of public intellectual property include those delivered by PBI and the U of S.

Very few projects produced private intellectual property for two reasons: 1) only a few private firms responded to the biotechnology request for proposals; and 2) the rise of the GMO debate during implementation of AFIF slowed the pace of private biotechnology research and development, in contrast to initial expectations of the strategic area committee. Nevertheless, at least one and possibly several biotechnology projects contributed directly to development of private intellectual property.

Stakeholder interviews also confirmed that technical assistance provided by AWB, in regard to the biotechnology regulatory system, aided several firms in the development and protection of intellectual property and biotechnology product patents.

Stakeholder interviews indicated that AFIF was successful in strengthening alliances, not so much from the standpoint of intellectual property development or product development, but from reinforcing the existing informal cooperative network among institutions.

2. Has there been an increase in employment opportunities within the agricultural biotechnology sector?

Interviews reported that there has been a limited increase in employment opportunities in public institutions involved in biotech research, especially for technologists trained by SIAST. Approximately 20 students per year graduate from SIAST and most find employment relatively quickly, usually in Saskatchewan.

Overall, employment opportunities are not yet being realized in the Saskatchewan private sector. In part, this is due to the delays in private sector investments resulting from the GMO debate and from the movement of some private plant breeding firms out of the province, during the period of AFIF.

Opportunities for professional development and diversification have been provided through training offered by the ABI under the biotechnology endowment. Initially, interest was high in the short courses being offered, interviewees report that interest is now diminishing. New directions may need to be assessed in regard to the professional development aspects of the ABI.

3. Has the public awareness level of the agricultural biotechnology sector been enhanced?

Work conducted by AWB, through its laboratory constructed with AFIF resources, has contributed to extending public knowledge and awareness of the agricultural biotechnology sector, especially for students.

AWB has also made important contributions to the design of national public information initiatives on biotechnology. AFIF funding enabled AWB to extend its capacity in the areas of communications and public awareness.

4. Has the knowledge of the agricultural biotechnology regulatory process been improved?

AWB provided information and advisory services to private firms to help them to understand the regulatory process and the process required to advance products through the regulatory system. This activity is now of lower priority as the overall system has matured. Work conducted under AFIF and provincial funding at AWB has become a model for similar organizations and functions in other provinces.

Representatives from AWB were able to serve on national committees to assist in the evolution of the national regulatory system and to contribute to greater public awareness and understanding during the GMO debate.

5. Has there been an increase in the number of qualified personnel available to work in the biotech sector?

There has been an increase of up to 20 students per year at the technologist level from SIAST. Most graduates are being employed, however many of the employment opportunities are temporary. SIAST could graduate up to 30 students annually in biotechnology. The constraint in training technologists is in attracting students with sufficient preparatory training out of high school in science studies. The AFIF project at SIAST was instrumental in advancing biotechnology training capacity in the province.

There has not yet been an increase in the number of post-graduates qualified in the biotech sector nor is there any significant number of students at the under-graduate level indicating interest at the scientific level. The biotechnology endowment has been of little assistance to date in increasing the number of MSc and PhD graduates in this field.

Unfortunately, the endowment funds have been of little assistance in supporting the virtual college of biotechnology from which there has been a significant increase in the number of graduates, especially under the biotechnology business option.

6. Has Saskatchewan's biotechnology community established and maintained an environment conducive to biotech research and is it identified as a logical location for biotech research? Have direct and spin-off benefits been reaped by the local and provincial economy?

Saskatchewan, especially Saskatoon, was already identified as a logical location for biotechnology research before AFIF. For example, PBI was located here along with a number of public and private organizations at Innovation Place.

AFIF strengthened biotechnology capacity in Saskatchewan and helped Saskatchewan keep abreast of research and development capacity in other parts of Canada and the world. AFIF especially helped fill a gap at the U of S in biotechnology although the potential of this investment has not yet been realized.

One of the strengths of Saskatchewan is the informal and close-knit network among scientists in federal, provincial, university and private institutions involved in research and development. AFIF helped strengthen this network but at the same time, it also crested competition for funding among the institutions and individuals. There was some emphasis on and significant success in fostering collaboration (e.g., PBI and U of S) but there should have been more. There are examples of AFIF funding of equipment which has duplicated capacity at PBI and Agriculture and Agri-Food Canada (AAFC), without clear evidence of collaboration.

AFIF U of S funding has been unsuccessful in fostering linkages with other institutions. Instead, there appears to be more of an inward focus at the U of S. Other institutions say they are now less aware of what is occurring at the U of S than before AFIF. A similar pattern has occurred at AAFC, especially with its recent policy of shifting from public research to private sector oriented research. There may be a need in the future to encourage more of a cooperative model, instead of a competitive model in project design and implementation.

It is too early to quantify direct and indirect benefits for the local and provincial economies. Research and development has been delayed due to the GMO debate. A specific example is the use of biotechnology in pulse crops. Earlier work conducted under AFIF has ceased because of an industry fear of traditional market loss if GMO crops are introduced.

3.7 Findings and Lessons Learned

The key findings and lessons learned within the biotechnology strategic area are summarized as follows:

- Growth in biotechnology product development and employment has not grown as quickly in Saskatchewan as anticipated; due primarily to the negative impact of the international debate regarding GMO's and the relocation out of province of personnel affected by company consolidations in the agricultural input industry.
- The AWB public education facility has been well received and well utilized, especially for student information and education.
- AWB personnel successfully supported smaller firms with regulatory issues, assisted in formulation of national biotechnology regulations and helped design the national biotechnology awareness program.
- Some infrastructure investments have not achieved satisfactory levels of utilization & self-sufficiency (e.g., Fermentation Plant, Genetic Services).
- The potential of the U of S biotechnology endowment has not yet been fully realized and some re-evaluation of objectives is warranted.
- Economic spin-offs from biotechnology research and infrastructure investments will take time to be fully realized.

4.0 FOOD PROCESSING STRATEGIC AREA

4.1 Strategic Area Description

Vision: A dynamic food processing sector which has an extensive understanding of markets with support mechanisms for technology and avenues for human resource development.

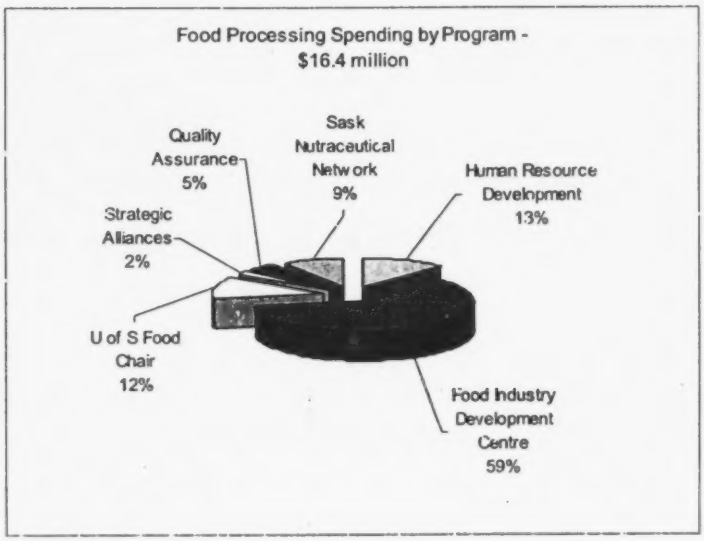
Figure 4-1. Food Processing Objectives

- Improve business skills of food processing SME owners
- Link expertise and skills to SME owners, in advisory capacity, through AFIF HR strategy
- Establish Food Centre to provide capacity and coordination for technical, research, product/process development, and quality control services
- Coordinate food processing research to support food sector through U of S food science endowment
- Increase awareness of investment and financial sectors in food industry potential
- Facilitate strategic alliances within food sector & others
- Support SNN to focus on regulation, advocacy, research and development, investment and support for nutraceutical, functional food and dermaceutical companies in Saskatchewan.

A total of approximately $16.4 million has been spent and/or budgeted within the Food Processing Sector. This total includes a $2 million allocation to a Food Processing Chair at the U of S, an endowment of $8.5 million to the Saskatchewan Food Industry Development Centre (FIDC), a human resource development program for the food processing, horticulture and non-food processing sectors and the

strategic alliance development program operated by the Saskatchewan Food Processors Association (SFPA).

Figure 4-2. Food Processing Expenditures by Program


Food Processing Spending by Program -
$16.4 million
Quality Assurance 5%
Sask Nutraceutical Network 9%
Human Resource Development 13%
Strategic Alliances 2%
U of S Food Chair 12%
Food Industry Development Centre 59%

Additional funds from the Reserve Fund were spent on building renovations to the Peterson Building and on equipment for the Food Centre; as well as funds being allocated for the Saskatchewan Nutraceutical Network (SNN) and Quality Assurance initiatives. The allocation of funds is shown in Figure 4-2.

4.2 Strategic Area Components

4.2.1 Food Industry Development Centre

In February, 1998, an Agreement was signed on the basic elements of the FIDC. The Centre has been established as a non-profit corporation partnering with Saskatchewan Agriculture, Food and Rural Revitalization (SAFRR), the SFPA and the U of S.

The objectives of the Centre are as follows:

- to provide processors with an interim processing facility to formulate, process and test market new product innovations,
- to provide processors and partners with current and accurate food industry information,
- to provide processors with the necessary tools to expand their businesses and compete in all markets,
- to increase awareness of the Food Centre and its capabilities in all sectors of the food processing industry in Saskatchewan
- to provide services to all sectors of the Saskatchewan food processing industry while considering the industry's time, capital and operational cost sensitivities,
- to improve the experience and education level of staff providing services to food processors of Saskatchewan.

4.2.2 Strategic Alliance Program - SFPA

The SFPA has identified the need to support the establishment of Strategic Alliances amongst their membership and with others to advance processing, marketing and distribution of food products. Specifically, the program has been designed to facilitate the efforts of SFPA members as they work to increase their access to new markets.

4.2.3 Human Resource Development Program

After an initial failed effort to launch a human resource development (HRD) program, a new program initiative has been launched so that Saskatchewan's agri-food industry can access expert advice in areas of finance, marketing, human resource management and other related management skills. The objectives of the program are to:

1. Improve business skills for small and medium sized enterprises in Saskatchewan. These skills would include financing, marketing, human resource management, operations and management processes and systems.

2. To link small and medium sized enterprises with the expertise of trainers, counsellors, organizations and institutions that can assist in the growth and viability of their companies.

3. To provide small and medium sized enterprises with access to and knowledge of services that will improve the ability of these enterprises to become more self-sufficient in their goal to establish a profitable and expanding business.

AFIF has entered into an untendered agreement with Marlin Stangland, Marinax Consulting, to manage and deliver this initiative.

The program is delivered in two phases:

Phase 1 Assessment Phase - up to a maximum of $5,000 of non-repayable funding is available to assist eligible clients in obtaining an expert assessment of their business. Clients may use the services of the fund manager and/or the services of other experts in the field.

Phase 2 Skill Development Phase - up to a maximum of $15,000 in non-repayable funding plus any funds remaining from the Assessment Phase ($5,000 less the amount charged for the assessment) is available for developing the skills of eligible clients. The $15,000 in additional funding must be matched dollar for dollar by the client.

4.2.4 Nutraceuticals

Vision: The short-term objectives of the SNN were to focus on regulation and advocacy, market development, and research and development facilitation. These objectives, as developed by AFIF, and encompassed in the SNN mandate, are as follows:

- Assist the development of infrastructure required by SNN members to support their growth and development.
- Support the coordination and development of research and analytical facilities required by SNN member companies to meet various federal and international regulations and to support the development of markets.
- Support the production of crops conducive to the manufacture of nutraceutical, functional food and dermaceutical products in Saskatchewan.
- Increase public awareness of nutraceutical and functional food products and their health benefits, and of the products and services of SNN members in local, national and international markets.

The SNN, a non-profit industry trade association, has received $1 million in AFIF reserve funding to assist in the growth and development of the nutraceutical, functional food and dermaceutical industry within Saskatchewan.

The agreement for the SNN project was started January 12, 1998, and the contract was signed on February 13, 1998. The contract was revised on June 9, 2000, and the project has now been extended until March 31, 2002. A further $450,000 was recently provided to extend the life of the SNN.

The current membership of the SNN is 137, with about 35 members representing an estimated 23 small companies in Saskatchewan.

4.2.5 Farm Focused Quality Assurance

Vision:	Within three years, all Saskatchewan commodities have an on-farm quality assurance program in development, and that Saskatchewan participation exceeds the overall participation rate in Canada.

A total of $600,000 from the Reserve Fund was allocated to the Farm Focused Quality Assurance Program.

The objectives of the Farm Focused Quality Assurance Program are as follows:

- To assist in the development of provincial delivery systems for national on-going commodity specific quality assurance programs.
- To assist in general awareness, promotion and education efforts for on-farm quality assurance programs targeted to producers of primary products.
- To assist in the training of individuals who will deliver programs or educate primary producers about on-farm quality assurance programs.
- To develop tools to enhance producer acceptability and compliance with on-farm quality assurance programs.
- To provide training for small meat processors in meat inspection techniques, disease identification and in the basics of Hazard Analysis Critical Control Points (HACCP) techniques.
- To develop communication strategies to enhance producer uptake.
- To enhance acceptability with processors and consumer groups.

4.3 Strategic Area Status and Influencing Factors

The Saskatchewan food and beverage industry has experienced significant growth over the period of AFIF. As indicated by Figure 4-3, the total value of shipments from food and beverage manufacturers increased by 59% over 1995, reaching $1.87 billion in 2001. Food processing continues to be the largest manufacturing component, representing about 26% of total value of shipments from all manufacturing plants located in the province.[18]

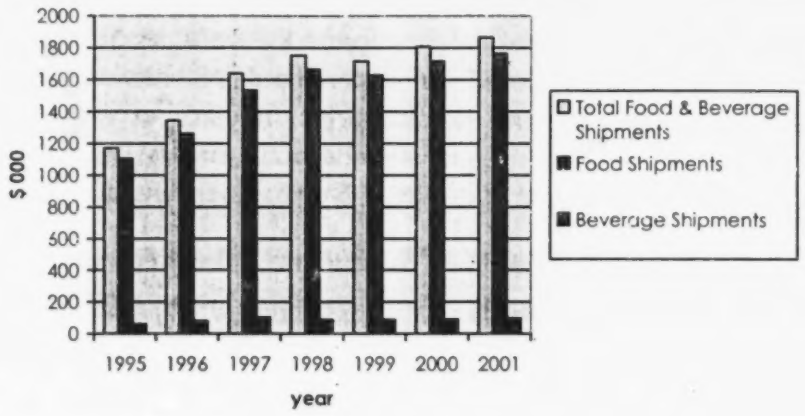
The food and beverage industry employs about 7,000 persons with an annual payroll of about $227 million. There is an estimated 300 food and beverage processing establishments in the province with about 75% being small to medium-sized operations with less than 20 employees. The main processing categories are meat products (30%), flour milling and bakery products (20%) and fruit and vegetable products (10%). Other products include beverages, dairy products, spices/condiments and nutraceticals.

There are about 50 food processors engaged in exporting from Saskatchewan. Total exports were $32.9 million in 2001, compared with $14.6 million in 1995, an increase of 125%. Exports almost doubled in value between 2000 and 2001.[19]

[18] QED Information Systems Inc., Sask Trends Monitor, October 2002, p. 11.
www.sasktrends.ca

[19] Saskatchewan Agriculture, Food and Rural Revitalization, Food & Beverage Processing Overview 2002, November 2002, Regina.
www.agr.gov.sk.ca/docs...food_and_beverage/food

Figure 4-3. Value of Shipments, Saskatchewan Food and Beverage Industry, 1995 – 2001



Source: Food & Beverage Processing Overview 2002, SAFRR

During the initial period of AFIF the potential for expanding nutraceuticals production in Saskatchewan was viewed positively by industry stakeholders. In 1997, the Nutrition Business Journal, one of the leading journals in the nutraceutical industry, estimated a 15% annual growth for the industry over the subsequent three years. Actual growth rates were 10% annually, declining to about 6% in 2001. Growth rates are projected to continue to decline to 2005.[20]

The main reason for the decline in nutraceutical industry growth rates is a decline in health supplement sales. The reasons for the decline in health supplement sales, are that the consumer novelty has worn off, market saturation is approaching and supplements are increasingly seen more as luxuries. Furthermore, there has been a lack of clinical test data, in some cases contributing to reduced consumer confidence. Finally, an economic slowdown has slowed consumer demand, media coverage has become more negative. The tight regulatory environment in Canada is viewed as a major limitation to industry growth.

An industry survey in 1999 identified some 50 companies that were involved in the Saskatchewan nutraceutical industry. Manufacturing growth rates were estimated at 50% between 1996 and 1998 and 60% between 1998 and 2000. Saskatchewan firms produced borage, emu oil, evening primrose, flaxseed, hemp, fish

[20] Nutrition Business Journal, Volume VI, No. 5/.6, Industry Overview 2001.

oil conjugated linoleic acid, pumpkin seed and canola phytosterols. Nine of the top twenty selling herbs in the U.S. and Canada were produced in the province. A new commercial processing and packaging plant for nutraceuticals was opened in Moose Jaw in 2001.

Over the past year, the industry experienced several serious setbacks. The new packaging plant ceased operations, reportedly for financial reasons, and several manufacturing facilities closed or experienced technical, supply or marketing problems. The Saskatchewan nutraceuticals industry experienced strong growth during the period of AFIF. It is currently encountering challenges that will need to be addressed within the context of declining North American market growth prospects.

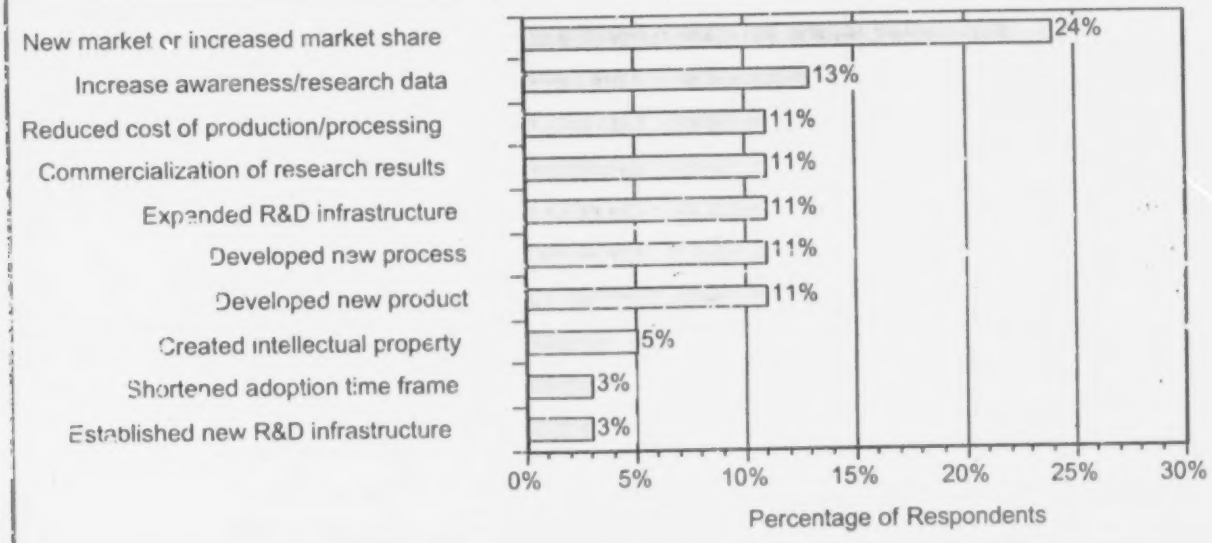
Several external factors and constraints influenced the outcome of AFIF expenditures on food processing initiatives. These factors included the following:

- Faced with ongoing unsatisfactory income levels from grains and oilseeds, many farmers continued to explore diversification opportunities through value added processing.
- Food processing company consolidations, ownership changes and a small local market are realities that are continuing to change the orientation of the Saskatchewan food industry towards more of a pan-western & international focus.
- Increased health awareness and the aging baby boomer population are expanding consumer interest in uses of nutraceuticals and functional foods and potentially opening new market opportunities.
- Growing consumer concern about the use of chemicals on crops and interest in organic foods is providing new market opportunities for producers and processors.
- Growing public concern about food safety issues is accelerating awareness of the need for adoption of HACCP standards at both farm & processor levels.

4.4 Project Outputs

Based on our survey of project managers, the key outputs in food processing were new/increased markets or improved market share; increased awareness and research data; reduced processing costs; commercialization of research results; expanded R & D infrastructure; and, new processes and products. The key outputs are illustrated in Figure 4-4.

Figure 4-4. Food Processing Outputs



4.5 Accomplishments and Results

Key accomplishments and results of AFIF investments in the food processing strategic area are as follows:

1. Human Resource Development Program

   - Needs assessments were conducted for about 35 small firms – less than 20% of the initial target.
   - Skill development training was provided for 20 firms in areas such as cost accounting, human resource management and software implementation.

- A group of 16 sub-contracted consultants provided limited training services.
- One-to-one counseling and training services were reportedly well received by clients.
- Two group training sessions were initiated; Business Planning – 75 participants and Costing – 30 participants.

2. Food Industry Development Centre

- Approximately 50 firms to date have been involved in product/process development, quality assurance & training provided by the FIDC.
- Services provided by the FIDC were well received by clients. Most clients have been small food firms involved in startup and survival stages of operation.
- There has been a rapid increase in utilization of facilities and staff during the past two years. Management estimates current utilization of the FIDC at about 70% of capacity.
- Endowment revenue and user fees cover operational and maintenance costs, not capital replacement costs. The FIDC business plan should address a policy regarding the use of FIDC endowment principle and interest, relative to fee revenues and industry needs.

3. Food Science Endowment

- Endowment funds were provided under AFIF to the U of S for a food scientist to work closely with FIDC staff on food science R & D.
- No new R & D outputs have been accomplished to date under the endowment as the Chair was and continues to be vacant.
- Decisions are needed to ensure that the original objectives of the Chair are achieved in the future.
- A strategic/business plan for the FIDC should address how the Research Chair should relate to the Food Centre.

4. Food Processing Alliances

- Most small food firms serve local Saskatchewan or prairie markets; some firms have prospects for exports in the future and can learn from the experience of other firms.
- Through AFIF support to the SFPA, several firms have been encouraged to work together on cooperative processing, marketing, supply purchases and trade show participation.

5. Nutraceutical Development

- Establishment and operation of the SNN has been well received by participants in the emerging nutraceuticals sector.
- The SNN has developed into a recognized North American network with many non-Saskatchewan organizations as members.
- The network is not self-sustainable at current activity levels without continuing government support.

6. Quality Assurance

- AFIF funded, farm-based quality assurance was slow in getting starting at the farm and small processor levels due to delays in CFIA and Canadian Adaptation and Rural Development Fund (Saskatchewan) (CARDS) funding approvals.
- The main poultry and livestock commodity groups in Saskatchewan have received funding for awareness, education and promotion.
- The program is contributing to a growing industry recognition of the importance of food safety and quality control starting at the farm level and continuing through the food system.
- Future funding of the program is uncertain but indications are that it may be assisted under the federal-provincial Agricultural Policy Framework (APF).

4.6 Response to Long-Term Framework Questions

1. How has the fund contributed to the development of a self-sustaining agri-food processing industry?

AFIF undertook several initiatives in food processing that contribute to the development of a self-sustaining agri-food processing industry. The key initiative was the establishment of the FIDC.

In its first two years of operation the Centre has demonstrated its potential to provide important developmental services to the food industry. Utilization of Center facilities have increased from about 25% initially to an estimated 70% during the current year. Interviews with users indicate a high level of satisfaction with the services provided, especially related to product and process development and establishment of HACCP procedures.

Another key initiative was support for the SFPA to advance strategic alliances. This assistance has enabled food industry firms to address common issues such as food promotion and marketing more cohesively.

Two other major initiatives related to food processing were the human resources development program and the establishment of the food scientist endowment. Neither of these initiatives have progressed as expected and nor have they achieved the objectives that were outlined in their program work plans or proposals.

2. Has there been an increase in the level of agri-food exports?

It is too early to tell whether there has been an increase in agri-food exports related to AFIF initiatives. The Food Centre has been serving food industry clients for about three years. Most of the firms utilizing the services of the Food Centre are smaller in size, many in a start-up or early development stage. Therefore, the development of export markets will not be the initial focus of these companies; rather local and western Canadian markets will be their focus.

Interviews with several Food Centre clients indicate that some export sales have already been achieved but sustainability of sales in the future is uncertain.

3. Has there been an increase in the level of food processing?

Provincial government data indicate that there has been a 59% increase in the level of food processing in Saskatchewan over the period of AFIF implementation. Smaller food processors are gradually increasing production as markets are developed. Further investigation on which sub-sectors (e.g., meat processing, oilseed processing, grain milling, etc.) are experiencing growth is warranted. However, the small number of processing firms in Saskatchewan raises confidentiality issues that limit the extent of sub-sector analysis based on published data. The SFPA tracks growth in food processing over time through a regular survey of members.

4. Have food processors used the knowledge and skills that have been acquired through customized training opportunities?

Interviews with the AFIF human resource program manager and with clients of human resource development services indicate strong support for one-on-one needs assessment and skills development. The firms contacted for evaluation follow-up confirmed that they had used or are using knowledge and skills acquired through the service provided. The main areas for business skills training were cost accounting systems, human resource management and strategic planning. It was noted by interviewees that managers of small firms are very busy and find it difficult to take the time required for further development of skills.

The group-training portion of the human resource program has not been activated.

The Food Centre provides training for clients to increase knowledge and skills on technical/technology topics and on health and safety aspects of food processing. Client interviews revealed strong support for this type of training and that knowledge and skills so acquired through interaction with the Food Centre are being used. Several interviews indicated that there could be an opportunity to offer both technology and business skills development through the Food Centre. Both types of skills are essential to successful development and growth of agri-food businesses.

When a firm makes contact with the Food Centre for assistance, a joint needs assessment could be offered in regard to technical and business skills and an integrated training plan could be developed to respond to the skill needs.

Under the foregoing scenario, it would be logical to place the human resource program directly under Food Centre management.

5. Has there been an increase in the number of trained personnel working in the food-processing sector?

No data could be obtained at this time on whether there has been an increase in the number of trained personnel working in the food-processing sector. Anecdotal information from several interviews suggests that there is an increase in employment associated with increased agri-food sales. The FIDC will provide training in particular skills (eg., HACCP, etc.), which could lead to increased employment of trained personnel in the future. The SFPA could track this indicator in the future through its survey of its members.

6. Is the Food Centre self-sustaining?

The annual operating and maintenance costs of the Food Centre are covered by interest earned on the endowment provided to the Centre and by fees for services provided to clients. Discussions with Food Centre management indicate that fees currently cover about 15% of direct costs, but vary from project to project. Depreciation and capital replacement costs are not covered by endowment revenues or user fees.. Other sources of funds must be sought to cover costs of new equipment.

The Board of Directors of the Food Centre has recently developed a a long-term business plan for the Centre. The business plan will need to address use of the endowment principle and interest, user fee levels, opportunities for custom processing and promotion of services beyond the province in order to address the sustainability issue.

7. What is the impact (improvement in quality, access, etc.) that the Food Centre has had on the food-processing industry?

Interviews with food industry stakeholders support the view that the Food Centre has been a sound investment for Saskatchewan. It is quickly becoming a food industry focal point with a very positive impact on the Saskatchewan food processing industry.

Access to product and process development expertise and facilities have been significantly improved for small and medium-sized food processing firms. Prior to establishment of the Centre, firms needed to go to food development centre facilities in Leduc, Alberta or Portage La Prairie, Manitoba. Location of a facility in Saskatchewan helps to address the needs of Saskatchewan firms locally. It also provides an added incentive for firms to expand and grow within the province, in close proximity to the Centre rather than looking at moving to another province to be closer to such facilities.

The Food Centre has pilot scale facilities that are compliant with federal inspection requirements and provides training on HACCP food safety and quality control principles. Thus, the Centre is proving to be very timely in meeting the needs of food processors as they meet the needs of increasingly conscious consumers for food safety issues.

8. Have strategic alliances resulted in production and marketing advancements (information, technology, sales, etc.) for Saskatchewan food processors?

The principle strategic alliance nurtured with AFIF funding was the program offered by the SFPA. Some of the benefits of the program include dissemination of information to member firms on opportunities for market promotion through industry food shows in other parts of Canada and in export markets, and on specific sales opportunities. The Association has facilitated joint product marketing initiatives involving several firms, start-up custom processing arrangements and joint purchasing of supplies.

The Association has helped engender a positive attitude towards opportunities for industry growth in Saskatchewan. The development of a new Saskatchewan food

product logo and theme is fostering pride in Saskatchewan's food products. The impacts of the developments associated with strategic alliances will be felt over the longer term.

9. Has AFIF contributed to the growth of the food processing industry?

As indicated, it is difficult to measure growth in the Saskatchewan food processing industry based on current and existing data. Improvements are needed in data collection on indicators related to Saskatchewan food industry investment, production, sales and exports. Industry-government cooperation is needed on this issue and could improve the industry information database for the future.

Nevertheless, based on anecdotal evidence from industry and stakeholder interviews, it seems clear that AFIF provided a positive boost to the Saskatchewan food industry through a major investment in infrastructure and ancillary services. It will take some time for these investments to provide tangible pay-offs. But, evidence of a positive attitude among food industry participants combined with some successes bodes well for future growth of the industry.

10. Has the nutraceutical industry grown through industry development, market development and employment since the inception of the SNN?

No public data could be obtained pertaining to growth of the Saskatchewan nutraceutical industry as measured by investment, sales or employment indicators, since inception of the SNN. Such data are confidential, even to the SNN administrators.

There is anecdotal evidence from the interviews that nutraceutical industry growth has not been particularly significant and has fallen far short of original expectations. Interviewees report that there have been some small successes but there have also been several recent failures of Saskatchewan businesses involved in nutraceutical production and packaging. These developments do not bode well for future industry growth in Saskatchewan.

Interviews and document review indicated strong support for the work of the SNN. The organization has a broad membership base including small Saskatchewan firms, large multi-national firms and many government and financial institutions with an interest in the future of the industry. Analysis indicates that about 15% of the SNN membership roster of 137, 23 firms with 35 members, are actually or are potentially engaged in the business of researching or producing nutraceuticals in Saskatchewan. Document research indicates that the SNN is viewed as one of the most successfully networks of its kind across North America, and has some 12 out-of-province members. There are about 46 members representing federal and provincial governments, 24 from universities (mainly U of S) and fee-for-service R&D institutions. The balance is from service firms (eg., banks) or associations.

11. Have Saskatchewan farmers and food processors participated in farm-focused quality assurance through training, communication, HACCP, and commodity programming?

Commencement of HACCP programming was late in the life of the AFIF program due to delays in funding of the national program under CARD and in CFIA approvals. Since receipt of approvals, AFIF funds have enabled significant advancement in awareness and education in Saskatchewan.

An application-based program was initiated. All major Saskatchewan poultry and livestock commodity groups have applied and received financial assistance for communication, awareness and training on the critical role and importance of food safety standards and practices from farmgate to consumer. Another aspect of the program has provided similar support for awareness and training of meat processing establishments.

4.7 Findings and Lessons Learned

The key findings and lessons learned regarding the food processing strategic area are summarized as follows:

- The SNN, HRD and quality assurance initiatives are unlikely to be financially self-sustaining in the future without ongoing government funding.
- The Food Centre is becoming recognized as an industry development focal point.
- The Food Centre must address the future use of the principle and interest portions of the endowment funds in its business plan.
- The HRD program could logically be delivered as part of the services provided by the Food Centre.
- The role of the food science chair should be reviewed to maximize effectiveness in relation to the R & D needs of the food industry.

5.0 HORTICULTURE STRATEGIC AREA

5.1 Strategic Area Description

Vision: The vision for horticulture is an effective and strong horticulture industry, which supplies unique horticultural products to Saskatchewan, Canada and the rest of the world.

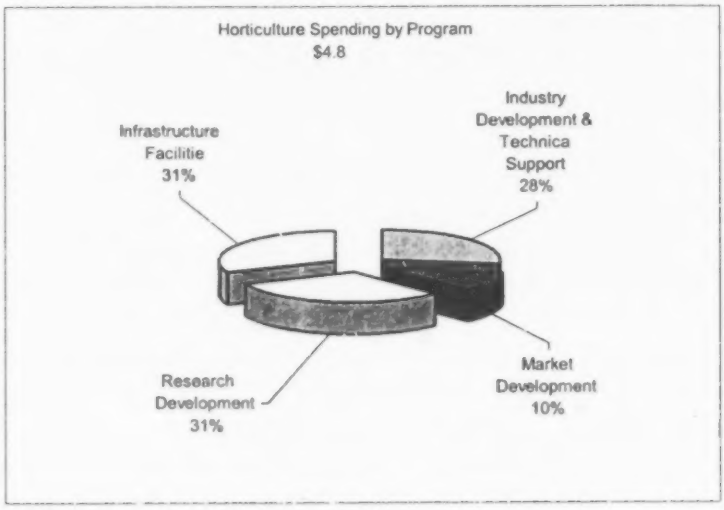
Figure 5-1. Horticulture Objectives

- Increase level of agronomic and post-harvest knowledge of producers through advisory services and studies.
- Assist expansion of industry through strategic planning, market research and development of marketing expertise.
- Assist in construction of physical R & D infrastructure.
- Support focus on project-based, market-driven applied research, development and demonstration to improve industry competitiveness & involvement.

The AFIF Board initially approved a total of $3.1 million for 23 projects under the horticulture strategic initiative. These funds included $0.2 million for HRD to be administered in conjunction with funds for HRD allocated from the food processing and non-food processing areas.

An additional $1.9 million was allocated from the AFIF Reserve Fund for 10 infrastructure and supplementary horticulture projects. In total, funding for the horticulture area was $4.8 million for 33 projects. These projects were distributed among the four horticulture components as illustrated in Figure 5-2.

Figure 5-2. Horticulture Expenditures by Program



5.2 Strategic Area Components

5.2.1 Industry Development and Technical Support

The objective of this initiative was:

- to increase the level of agronomic and post-harvest knowledge of Saskatchewan's horticultural producers through a variety of horticultural advisory services and studies.

The AFIF Strategic Area Committee (SAC) initiated an industry overview study to assess the potential for a consolidated strategic approach for the various horticulture industry organizations. However, the industry sub-sectors preferred to work through their existing associations as represented on the horticulture SAC.

The committee identified the absence of specialized technical support in several areas as constraints to growth. The U of S and SAFRR were requested to prepare proposals for four key positions related to disease management, post-harvest technologies, greenhouse diagnostics and vegetable production.

5.2.2 Market Development

The overall objective for projects selected within Market Development was:

- to assist the development and expansion of the Saskatchewan horticulture industry by preparing strategically focused market strategies, identifying new domestic and export market opportunities and developing additional marketing expertise within the horticulture industry in Saskatchewan.

Market development for seed potatoes and fruit crops, especially saskatoon berries was identified by the SAC as an important requirement for growth in these sectors. Other sectors identified development of the horticultural market within Saskatchewan as an important opportunity.

A horticulture market and trade development request for proposal was issued with closing date of December 15, 1997. Projects were reviewed by the horticulture SAC and the AFIF Board approved 5 projects totaling $0.5 million.

5.2.3 Research and Development

The objective of the Research and Development component was as follows:

- to support a project based research and demonstration program designed to improve the industry's capability to compete in an expanding marketplace. The focus will be on applied, market driven research and development with an emphasis on industry involvement and commitment.

The SAC identified the need for new cultivars and plant materials adapted for commercial use by Saskatchewan horticulture producers. Research and demonstration of improved management and agronomic practices was considered to be vital to expanding Saskatchewan horticultural production and marketing.

The AFIF Secretariat issued a horticulture research and development RFP closing on December 15, 1997. Project applications were reviewed by the horticulture SAC and 13 were approved.

5.3 Strategic Area Status and Influencing Factors

The Saskatchewan horticultural sector includes mixed vegetables, table and seed potatoes, domestic and native fruit varieties, and greenhouse and nursery crops. Overall, horticulture production experienced significant growth during the period of AFIF, especially for native fruit, seed potatoes and greenhouse crops.

The main market for mixed vegetables is the local fresh market with local market opportunities continuing to exceed production. The area of mixed vegetables declined by 60% between 1996 and 2001.[21] There continues to be one main vegetable processor in the province concentrating on production of processed cabbage and potato salad.[22]

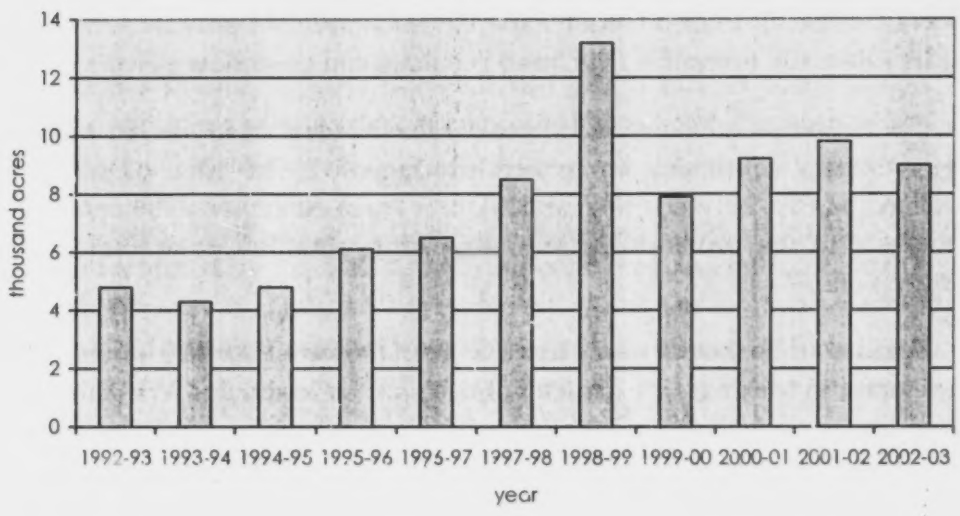
Because of Saskatchewan's disease free environment, seed potato markets have developed in Mexico, U.S. growing areas such as Idaho and Washington, as well as other Canadian growing areas such as Alberta, Manitoba and Prince Edward Island. While seed potato production has increased, table production has remained steady with a primary focus on local Saskatchewan markets. Acreage of table potatoes has grown from about 3,000 acres to 5,000 acres over the past ten years, while seed potato acreage steadily increased from about 2,000 acres to 5,000 matching table potato area.[23] Growth in total potato are in Saskatchewan is illustrated by Figure 5-3.

[21] Saskatchewan Agriculture, Food and Rural Revitalization, 2001 Fruit and Vegetable Area, June 2001, Regina.
www.agr.gov.sk.ca/docs...re/fruitveggies

[22] Saskatchewan Agriculture, Food and Rural Revitalization, Horticulture Overview 2002, November 2002, Regina.
www.agr.gov.sk.ca/docs...greenhouses/vegetable

[23] Saskatchewan Agriculture, Food and Rural Revitalization, "2002 Potato Area", StatFacts, November 2002, Regina.

Figure 5-3. Potato Acreage, Saskatchewan, 1992-93 to 2002-03



Source: 2002 Potato Area StatFact, SAFRR

Fruit production continues to be an emerging sector in Saskatchewan with a primary focus on saskatoon berries, chokecherries, strawberries and seabuckthorn berries. The number of small companies involved in processing has increased from two processors in 1991 to about 20 in 2001. The main fruit products are frozen berries, jams, pie fillings and syrups for local specialty and retail markets. Significantly, Saskatchewan processed about 8.6% of the fruit processed in Canada in 2001.[24]

There are currently some 145 commercial greenhouse operations in the province a decrease of about 30% since a peak in numbers reached in 1997. During the same time period, area under plastic/glass increased over 40% to 2.1 million square feet.[25]

[24] Saskatchewan Agriculture, Food and Rural Revitalization, Fruit Overview 2002, November 2002, Regina. www.agr.gov.sk.ca/docs/processing/fruit

[25] Saskatchewan Agriculture, Food and Rural Revitalization, Saskatchewan Greenhouse Industry 2002, November 2002, Regina. www.agr.gov.sk.ca/docs...ulture/greenhouse

The main products are ornamental flowers and plants with small quantities of tomatoes, cucumbers, lettuce and peppers.

About 25 farms comprise the Saskatchewan nursery trade industry. The main products are bedding plants, perennial plants, trees and shrubs. Total crop area declined steadily to about 995 acres in 2001.[26]

Several external factors and constraints influenced the outcome of AFIF expenditures on horticulture initiatives. These factors included the following:

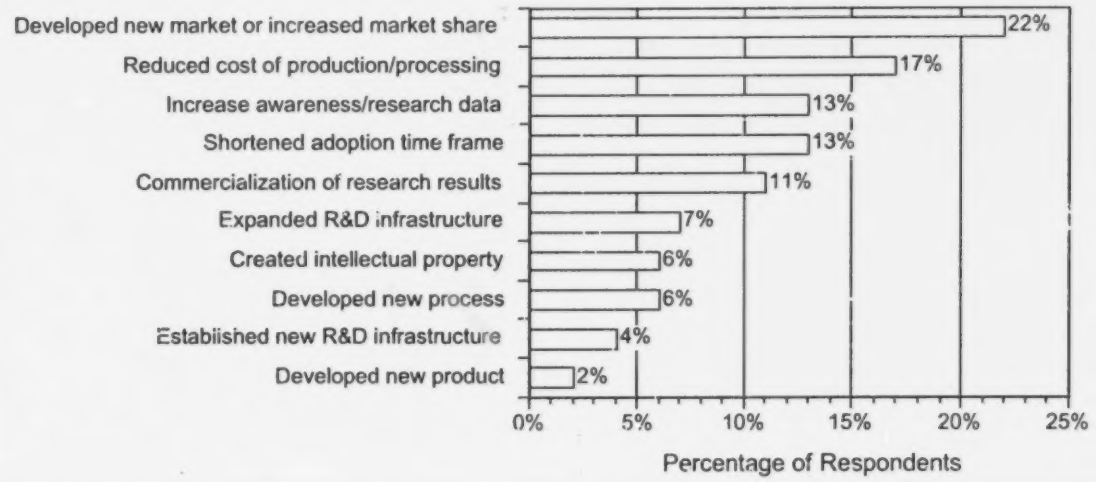
- Provincial government investment in the potato industry as well as infrastructure ownership changes and market conditions contributed to Saskatchewan table potato production and markets during the term of AFIF.
- Additional new market opportunities became available to Saskatchewan disease-free seed potatoes when disease outbreak disrupted the P.E.I. potato industry.
- The lengthy federal approval system and the small size of local markets limited development and registration of proprietary minor use pesticides for horticultural crops.

5.4 Project Outputs

Based on our survey of project managers, the main outputs for horticulture were development of new markets; reduced production and/or processing costs; increased research awareness; shortened adoption times; commercialization of research results; and, expanded R & D infrastructure.

[26] Saskatchewan Agriculture, Food and Rural Revitalization, Saskatchewan Nursery Trades Industry, November 2002, Regina.
www.agr.gov.sk.ca/docs...orticulture/nursery

Figure 5-4. Horticulture Outputs



5.5 Accomplishments and Results

Key accomplishments and results of AFIF investments in horticulture industry development, research, infrastructure and training are as follows:

1. Industry Development, Market & Technical Support

- Specialists in pathology, post-harvest practices, greenhouse diagnostics, vegetable production, seed potato marketing & fruit industry development were funded under AFIF.

- Some positions (e.g., vegetable & greenhouse specialists) may be continued beyond AFIF with funding from SAFRR while others (e.g., pathologist, fruit industry market development specialist) may not continue which may result in potential gaps in expertise & information in these areas.

2. Research, Infrastructure & Training

- Several new opportunities and practices have been demonstrated which producers are beginning to adopt or benefit from (e.g.,

vegetable production practices, saskatoon berry post-harvest chilling, etc.).

3. Human Resource Programming

- HRD training for horticulture was not delivered as planned and was limited to a few firms involved primarily in food processing.

5.6 Responses to Long-Term Framework Questions

1. How has improved infrastructure helped to increase capacity to conduct research in the horticulture sector?

Increased infrastructure investment resulting from AFIF was primarily in the form of human resources to provide incremental industry development and technical support. These resources included a research pathologist, a post harvest specialist for fruit crops, a greenhouse technician, a vegetable specialist and a market development specialist for native berry crops.

In particular the research pathologist and post harvest specialist, located at the U of S, conducted research of benefit to seed potato producers and saskatoon berry production. For example, research results on rapid post harvest chilling of berries was quickly adopted by several leading saskatoon berry producers resulting in extended shelf life and a longer marketing season for fresh berries.

The capacity to conduct horticulture research and to effectively transmit research results to producers increased with AFIF funding. We were advised during our informant interviews that the research positions funded at the U of S will be terminated, upon completion of AFIF.

2. Have the horticultural program activities addressed industry needs?

Interviews with industry stakeholders strongly confirmed that horticultural program activities successfully addressed industry needs. Examples included the following initiatives:

- work on vegetables demonstrated new opportunities for vegetable production in Saskatchewan;
- technical and market assistance have helped expand production and marketing of disease free Saskatchewan seed potatoes;
- market development for saskatoon berry crops helped expand markets for fresh and processed product and is helping to move that industry closer to maturity; and,
- technical support is helping the rapidly expanding greenhouse industry in the province.

AFIF-funded activities have been well received by the industry and we were advised that SAFRR plans to continue internal funding for some of the activities, especially the greenhouse technician and vegetable specialist.

3. Was the AFIF horticulture program cost effective?

It is difficult to measure the cost effectiveness of the AFIF horticultural programs because the benefits will be felt over the longer term. Nevertheless, evidence indicates that the horticulture program had well defined objectives and the activities funded were clearly targeted at the objectives. Existing research and demonstration facilities were more fully utilized with provision of additional human resources.

Industry feedback on the impacts and effects of the various AFIF-funded horticulture activities was very positive. The economic benefits of a longer marketing season for fresh saskatoon berries and expanded markets for disease free

seed potatoes outside of the province are already being realized and will continue in the future.

4. Has the horticulture sector been strengthened with AFIF programming?

As indicated, the horticulture sector has been strengthened in a number of respects with AFIF programming. In some instances, such as saskatoon berries, seed potatoes and some vegetable crops, new industry strength and maturity realized during the term of AFIF has positioned the industry to prosper and grow. A new level of self-reliance has been achieved as a result of AFIF support.

5. Have both domestic and international markets been identified, and have sales volumes and acreages increased?

Both domestic and international markets have been identified and targeted especially for saskatoon berries and seed potatoes. Significant import-replacement opportunities continue to be provided by local Saskatchewan markets and these will continue to be the focus of vegetable, table potato and greenhouse crop potato production for the near future.

Saskatchewan farm cash receipts, from SAFRR data for several horticulture crops, have increased significantly since 1999. For example, potatoes have increased from $29.1 million in 1999 to $34.7 million in 2001. Berry crops (primarily saskatoons) have grown from $372 thousand in 1999 to $722 thousand in 2001. Floriculture and nursery crops have experienced a striking increase from $14.5 million in 1999 to $24.3 million in 2001. Increases in farm cash receipts are due both to increased production area and to improved prices, in some cases resulting from more timely marketing and high quality product (e.g., saskatoons and seed potatoes).

6. Have horticulture producers applied the knowledge and skills acquired through the agri-business human resources training program?

Horticulture producers have not benefited from the human resource training program because of a heavy focus of the program on the food industry. At most, three horticulture producers, primarily involved in processing, were contacted and consulted in relation to human resource needs assessment. Consequently, horticultural producers have not been able to apply knowledge and skills available through the human resource training initiative.

7. Have crop protection products utilized by Saskatchewan producers been registered? Are there more registered products available for utilization by Saskatchewan fruit growers?

Registration of minor use pesticides continues to be a challenge for the Saskatchewan horticulture industry because of the small size of the provincial production base for many crops. It is reported to be uneconomic for companies to pursue registration steps for products with a small market potential. At the same time, the federal pesticide registration process, even for minor use pesticides, continues to be lengthy and costly. Current indications are that the Agricultural Policy Framework (APF) may support initiatives aimed at minor use of pesticide registration.

Data were collected under several AFIF projects to support applications for minor use herbicide registration. For example, data were compiled to support registration of 4 pesticides for chokecherries and 4 herbicides for 4 different berry crops. Applications for 3 minor use registrations for potato and vegetable seed treatment were also submitted. There are no indications from survey responses that additional products have been registered.

8. Have horticultural producers demonstrated an understanding of and an adoption of new management systems and agronomic recommendations?

Stakeholder interviews indicate that horticulture producers have been active participants in research and demonstration projects and in field days and technology transfer workshops. Strong interest is demonstrated in adoption of new management systems and agronomic recommendations. Expanded horticulture production offers economic diversification potential for some producers, especially those with access to reliable water supplies (e.g., irrigation and higher rainfall areas of the province).

5.7 Findings and Lessons Learned

The key findings and lessons learned regarding the horticulture strategic area are summarized as follows:

- AFIF-funded horticulture components were considered by informants to be very useful for growth & development of the industry, especially for small berry crops, vegetables & seed potatoes.
- Elimination of some technical resources upon termination of AFIF funding may impede future growth.
- Horticulture production, especially for import replacement and for strategic exports (e.g., disease-free seed potatoes) represents a diversification opportunity for some producers in areas of the province with sufficient water supplies (e.g., irrigated areas around Lake Defienbaker).
- HRD support the horticulture Strategic Area was inadequate.

6.0 INFORMATION TECHNOLOGY STRATEGIC AREA

6.1 Strategic Area Description

Vision: An agri-food information system which improves the lives and well-being of all Saskatchewan people, and enhances the prosperity of Saskatchewan's agri-food industry through the use of information technology is the overall vision of this strategic area.

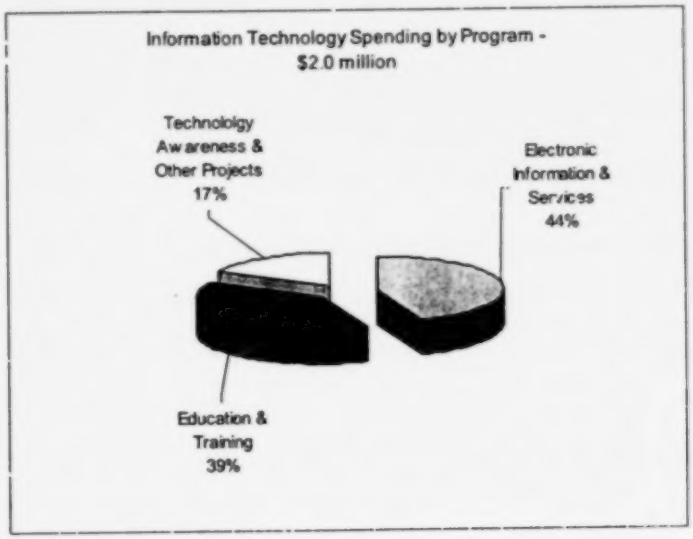
Figure 6-1. Information Technology Objectives

- Create and enhance new electronic agricultural information system which brings advantages of emerging information technologies to Saskatchewan agricultural community.
- Educate and train agriculture community on use of emerging electronic technologies.
- Make agriculture community aware of the existence and benefits of emerging electronic technologies.

The increasing pace of change brought about by technology has been well covered by the general media over the last five years. What is currently new and exciting is passé and outdated only a few months later. Business models are created, tested and changed in what can seem like the blink of an eye. Every industry is struggling to define what these developments mean to their business, how they can benefit from new ways of managing information, and how they will need to change to ensure their survival.

Agriculture, like every other industry, must deal with these challenges. Recognizing this, AFIF set aside $2 million to assist agricultural producers in capitalizing on the opportunities that present themselves as the result of changes in information technology. This funding was distributed among three areas, as shown in Figure 6-2.

Figure 6-2. Information Technology Expenditures by Program


Information Technology Spending by Program -
$2.0 million
Technology Awareness & Other Projects 17%
Electronic Information & Services 44%
Education & Training 39%

6.2 Strategic Area Components

6.2.1 Electronic Information and Services

The objective of this initiative was:

- to create and enhance a new electronic agricultural information system which brings the advantages of emerging information technologies to the Saskatchewan agricultural community.

The "new electronic agricultural information system" created by this funding initiative was AgInfoNet. The funding in this area was allocated among three (3) projects, which were managed by AgInfoNet.

6.2.2 Education and Training

The objective of the education and training initiative was:

- to educate and train the agriculture community on the use of emerging electronic technologies.

The four projects created under this initiative were managed by Agricultural Institute of Management in Saskatchewan (AIMS).

6.2.3 Information Technical Awareness

The technical awareness initiative of the information technology strategic area had the following objective:

- to make the agriculture community aware of the existence and benefits of emerging electronic technologies.

Only one project was undertaken by this initiative.

6.3 Strategic Area Status and Influencing Factors

Computer usage on Saskatchewan farms is growing rapidly, although it lags slightly behind the national farm usage level. For example, the 2001 Census of Agriculture indicates that computers were used by 35% of Saskatchewan farms, up from 20% in 1996 – an increase of 75% over the five years. Computers were used by 39.4% if farms nationally.[27]

In terms of use, some 76% of farms reported using a computer for bookkeeping, 74% for accessing the Internet and 67% for e-mail. Larger farms used a computer more than small farms. For example, 60% of farms with sales over $250,000 used a computer, compared with less that 25% of farms with sales under $25,000.

Several external factors and constraints influenced the outcome of AFIF expenditures on information technology initiatives. These factors included the following:

Communications, wireless technology and personal computer systems have advanced rapidly so that most Saskatchewan farmers have access to Internet and email services.

[27] Statistics Canada, 2001 Census of Agriculture, Saskatchewan Release, Ottawa, May 2002. www.statcan.ca/english/agcensus2001/first/regions/farmsk.htm

There are indications of growing awareness and acceptance among farmers of opportunities for selling farm products and purchasing farm inputs over the Internet.

Opportunities for realising the potential of web-based technology and information technology developed rapidly – the AFIF information technology program was not able to adapt to these changes.

6.4 Project Outputs

Project outputs in the information technology area are difficult to determine because the major AFIF-funded initiative, AgInfoNet, has become a private company. As a private entity now, the owners are not as willing to share output and impact data.

6.5 Accomplishments and Results

Key accomplishments and results of AFIF investments in the information technology area are as follows:

1. Electronic Information & Services

- Agri-Carta and AgInfoNet were further advanced under AFIF, then merged and now operate as a private business on a fee-for-service basis to client members.
- The main public benefit of AgInfoNet is a system of links to other agriculture web-sites.
- The information technology area could have been managed as an over-arching issue affecting the other strategic areas, rather than being handled as a separate strategic area.

2. Training/AIMS

- Training offered to farm managers included training on the use of computers/Internet, networking, conferences and pilot seminars on particular topics (e.g., biotechnology).
- Internet conferences and pilot seminars were useful developmental experiences while farmer-training sessions seemed to be of limited success.

6.6 Responses to Long-Term Framework Questions

1. Has there been an increased awareness of the value of information technology for agricultural producers? for production information? for marketing information? for business management information?

Management of the information technology program was unable to provide any baseline data on awareness levels of agricultural producers regarding the value of information technology, as an information access tool, prior to implementation of AFIF. Consequently, it is impossible to state directly whether there has been any change in the level of awareness of information technology for this purpose.

Census data indicate that ownership and use of computers by farmers has steadily increased over the past ten years. With improved telephone, cable and wireless connections in rural areas, most farmers with computers now have access to the Internet and, in turn, access to sources of information on production, marketing and farm business management.

2. Do farm managers utilize Agri-Carta and AgrInfoNet as an information source?

Agri-Carta has been folded into AgrInfoNet as a library component. AgrInfoNet has become a privately held company called AgrInfoNet Canada Inc. The company offers several services.

One service, the library component is a free web-based system of links to a number of publicly accessible data sources (e.g., SAFRR; Agriculture and AAFC,

etc.). Topics are organized along commodity based lines. Another service is a membership-based network for sale and purchase of several lines of farm inputs (e.g., fuel, chemicals, etc.).

We were unable to ascertain whether farm managers utilize the system as an information source. The private owners of the company declined to provide information on the number of web-site "hits" and to what extent farmers access the system.

3. Are farm managers using information technology to electronically manage commercial transactions?

The proprietors of AgInfoNet were unable to provide information on the extent to which farm managers are using information technology to electronically manage commercial transactions. No other sources of information could be found to shed light on this question. A survey of farm managers on the issue was outside the scope of this evaluation.

4. Have training and educational opportunities resulted in improved information technology skills for Saskatchewan farm managers?

AFIF-funded training and education opportunities offered through AIMS courses were partially successful in improving the information technology skills of Saskatchewan managers. The level of producer participation in courses offered was disappointing.

Pilot seminars utilizing computer-based video conferencing were useful in demonstrating the application of innovative technologies in information dissemination.

6.7 Findings and Lessons Learned

The key findings and lessons learned regarding the information technology strategic area are summarized as follows:

- The information technology area suffered from lack of strategic direction (e.g., well-defined goals) at the outset and an inability to respond to changing opportunities and rapid changes in technology.

- A private company (i.e., AgInfoNet Canada Inc.) has been created providing services to clients on a fee for service basis.

- Some experts consulted suggested that AFIF funds allocated for Information Technology could have been invested more appropriately in electronic and multi-media infrastructure to support extension and technology transfer. In addition, Information Technology doesn't really represent a Strategic Area but rather an over-arching technology found in all areas.

7.0 NON-FOOD PROCESSING STRATEGIC AREA

7.1 Strategic Area Description

Vision: The vision for non-food processing is a diverse and competitive market-driven value-added sector which processes biological materials to produce useful products and ingredients for sale in both the Canadian and international marketplace.

Figure 7-1. Non-Food Processing Objectives

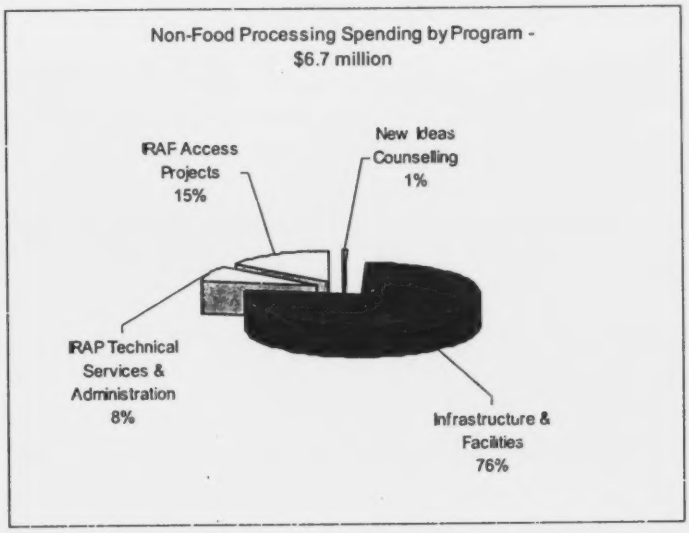
- To assess non-food processing value added ideas.
- To provide direction on stages required for idea development.
- To improve capability of institutions to assist clients in long term non-food processing initiatives.
- To improve access to R & D infrastructure and services by assisting non-food processing businesses with research, development, technology transfer and marketing.

For the purpose of AFIF, non-food processing is defined as "the transformation of biological materials for purposes other than direct consumption as human foods."[1] In the AFIF program, projects included infrastructure investments for feed processing, ingredient preparation and nutraceutical development as well as support for commercialization of new products.

The AFIF Board has approved a total of $6.7 million for 30 projects in the non-food-processing area. The funds were distributed among the four strategic initiatives as illustrated in Figure 7-2.

[1] Agri-Food Innovation Fund, Request for Proposals for Non-Food Processing Facilities, Regina, January 29, 1997. P. 2.

Figure 7-2. Non-Food Processing Expenditures by Program


Non-Food Processing Spending by Program -
$6.7 million
IRAF Access Projects 15%
New Ideas Counselling 1%
IRAP Technical Services & Administration 8%
Infrastructure & Facilities 76%

The characteristics and objectives of the four strategic initiatives developed and implemented under non-food processing are described as follows:

7.2 Strategic Area Components

7.2.1 New Ideas Counseling

The objectives of the service were as follows:

- to assess non-food processing value added ideas; and,
- to provide direction on stages required for idea development.

This service was designed to assist proponents, with limited resources, to move new non-food processing ideas in early stages of development through to commercialization. The target clients were producers, individuals and commodity groups in rural areas. Counseling services included preliminary evaluation of ideas, planning, advice on maintaining confidentiality and information on available assistance programs.

A private consulting firm was selected through a request for proposal process and approved for a project to deliver the New Ideas Counseling Service. The service provider's fees were paid 50% by clients and 50% by AFIF to a maximum of $5,000 of AFIF funding per client. Funding of $500,000 was earmarked for the program. The service provider implemented the program as planned. Of the earmarked funds, a total of $36,000 was expended for program delivery services.

7.2.2 Infrastructure and Technology Development

The overall objective for projects selected within Infrastructure and Technology Development was:

- to improve the capability of institutions to assist clients in long term non-food processing initiatives.

The purpose of this assistance was to foster the long-term development of processing initiatives by increasing the non-food processing capabilities of key research and development institutions. Financial assistance was provided to upgrade facilities, equipment and human resources skills development in support of development and commercialization of technologies.

A total of $5.3 million was allocated to this initiative and a public request for proposals closed in January 1997. A total of 33 letters of intent were received requesting $20 million. Selection criteria were used to rate all project proposals resulting in requests for full proposals from a number of proponents.

Several proposals were considered for funding under other AFIF strategic areas (e.g., food processing, nutraceuticals, specialized crops). Funding was approved for 6 non-food processing infrastructure projects from 4 institutions. One additional project was funded from the AFIF Reserve.

7.2.3 Improved Access to Existing IRAP Resources

The objective of this initiative is:

- to improve access to research and development infrastructure and services by assisting non-food processing businesses with

research, development, technology transfer and marketing activities.

AFIF and the Industrial Research and Assistance Program (IRAP) of the National Research Council developed a cooperative program to provide technical and financial assistance for innovative non-food processing projects.

Eligible applicants are small- and medium-sized Saskatchewan-based companies or industry associations. Applicants must meet IRAP's normal criteria to cover salary and sub-contract costs. Other eligible costs (e.g., pilot plant use, product testing, market development, etc.), not normally covered under IRAP, may be supported up to 50% under AFIF. A total of $2.0 million was allocated to this program.

A total of 28 non-food processing IRAP projects totaling $989,000 were approved. Funding of $518,000 was provided for 4 projects to provide contract program administration and technical assistance to IRAP/AFIF clients. Thus, total expenditures were about $1.5 million from the AFIF budget for IRAP of $2.0 million.

7.3 Strategic Area Status and Influencing Factors

The non-food processing area was designated for a discrete focus under AFIF to foster capacity building. Most agricultural processing operations produce both food and non-food outputs. Under AFIF, there was emphasis on projects devoted to first-stage crop processing through Prairie Agricultural Machinery Institute (PAMI), production of non-food, feed, fibre and/or industrial ingredients through the Protein Oil and Starch (POS) plant, U of S and AAFC, and feed products through Prairie Feed Resource Centre (PFRC).

Hog and beef cattle production increased in Saskatchewan during the period of AFIF. There was increased demand for competitively priced feeds based on local cereal, oilseed and pulse crops and other local ingredients such as screenings from interior terminals and special crops processing plants.

The PFRC successfully worked with several clients to develop various new feed products using canola, peas and flax. Several new pelleting plants were built to utilize screenings and other feed ingredients. Some feed products developed during the period of AFIF were also targeted to export markets in the Pacific Rim.

The forage processing industry, especially production of dehydrated alfalfa declined steadily during the period. The decline was associated with higher shipping costs from loss of the WGTA subsidy and effects of U.S. farm bill price supports for corn. At the same time new opportunities were pursued for processed forage products based on innovative technologies.

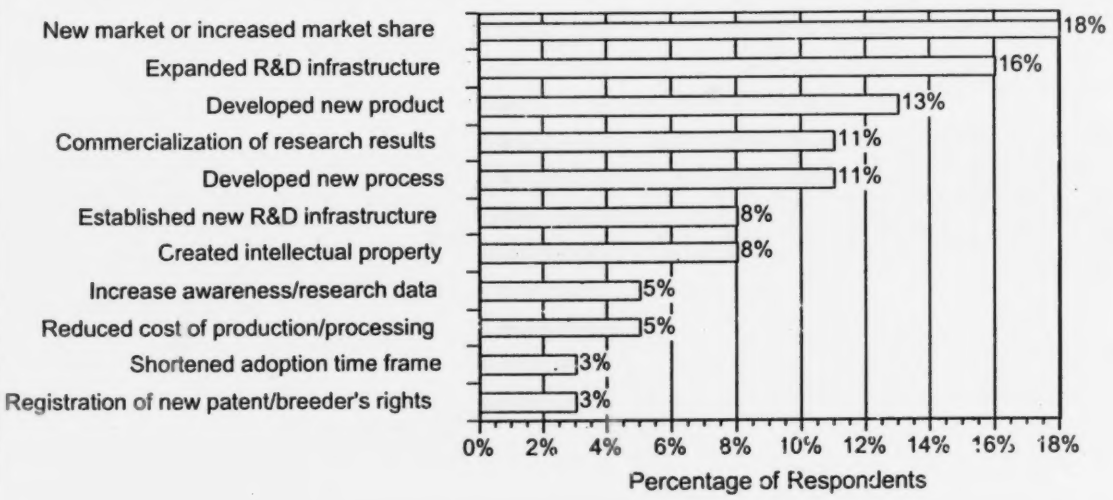
Several external factors and constraints influenced the outcome of AFIF expenditures on non-food processing initiatives. These factors included the following:

- AFIF funding principles excluded the availability of support for projects that would directly benefit commercial enterprises or individual firms, except under IRAP, where AFIF provided additional support under an existing program. This was done because generalized industry benefit would be achieved. The projects had to be unique pilots.
- The narrow implementation window timeframe limited the number of business development proposals that could be handled under IRAP.
- Back-to-back prairie droughts in 2001 and 2002 slowed production growth for some crops with value-added processing potential (e.g., forage).
- Shift in corporate business plans affected the outcome of some projects (e.g., Durafibre)

7.4 Project Outputs

Based on our survey of project managers, the main non-food processing outputs were new markets or increased market share; expanded or new R & D infrastructure; commercialization of research results; new products and processes; and, creation of intellectual property.

Figure 7-3. Non-Food Processing Outputs



7.5 Accomplishments and Results

Key accomplishments and results of AFIF investments in non-food processing R & D infrastructure and business development are as follows:

1. Infrastructure Investments

- AFIF investments in non-food processing physical infrastructure (e.g., POS, AAFC Crop Utilization unit, PAMI, etc); and, in human capital (e.g., PFRC) contributed to the attainment of a new level of capacity & expertise in non-food processing.

- Significant new economic value was reported to be created by the PFRC in cooperation with clients in development and testing of new feed formulations based on Saskatchewan grown ingredients (e.g., pea & canola based rations).

- Benefits from several investments (e.g., PAMI) will take longer to realize because of relatively low levels of utilization to date.

2. Access to IRAP

- Improved access to the existing IRAP (i.e., additional expenses eligible for assistance) was an innovative and efficient approach for fostering commercialization.
- Administration/technical advisory service costs under the AFIF-assisted component of IRAP were high relative to the level of assistance provided.
- About 20 firms (several firms had more than one project) were assisted in the commercialization process; many are still underway; some operations have already achieved initial success; some have failed.

7.6 Responses to Long-Term Framework Questions

1. Have non-food processing ideas been supported from the "idea" stage through to the successful development stage?

The concept of supporting ideas from the "idea" stage through to successful development was tried under the New Ideas Counseling Service of the non-food-processing strategic area.

A private consulting firm was selected to administer the service through a request for proposal process. Clients were required to provide 50 % of the cost with AFIF providing the balance. Of $500,000 earmarked for the service, $36,000 was expended. The service was terminated due to insufficient client interest.

IRAP played a role in supporting projects at the commercialization stage.

2. Have non-food processors commercialized technology and enhanced business development?

Interviews with stakeholders, clients and project managers indicate that IRAP was the facet of non-food-processing most relevant to commercialization of technology and enhanced business development.

Under the AFIF agreement with IRAP, a project would be eligible for assistance for additional costs, not eligible under IRAP, provided the project met all other IRAP criteria. A total of 20 firms were assisted with commercialization of technology under the AFIF portion of IRAP. Several of these projects have already succeeded in commercialization; several have failed or ceased operation due to adverse financial circumstances or changing priorities; and, several are still under development.

The PFRC was another area where significant progress was achieved in assisting clients in commercialization of research and business development. Additional human resource infrastructure provided to the PFRC, was instrumental in development of new formulations incorporating locally produced pea protein and canola meal, especially for hog rations. Preliminary estimates of incremental annual sales of upwards of $30 million annually are forecast.

During interviews, it was reported that services offered by several other institutions (e.g., POS, PAMI and AAFC Crop Utilization unit) have been successful in commercializing technology. The numbers of such projects are not large to date.

Case studies are valuable tools to assess the economic and business impacts of technology commercialization. It is too soon to undertake such studies but they should be used as a tool in the future to assess commercialization impacts.

3. Are non-food processors accessing support services from R&D infrastructure?

Non-food processors are accessing services provided by institutions that received funding for infrastructure investments under AFIF. In particular, POS, PAMI and AAFC Crop Utilization unit indicated they have been providing services to clients. However, PAMI advises that utilization of the crop processing centre has been below expectations and that the facilities are likely ahead of the non-food processing industry's ability to utilize the services.

4. Have non-food processors applied knowledge and skills acquired in the agri-business human resource training program?

To date, the human resource training program has provided minimal service to non-food processing firms. At the most, preliminary discussions and needs

assessment has been provided for three businesses. The HRD program was fundamentally irrelevant to non-food processors because the HRD focus was on food processing.

7.7 Findings and Lessons Learned

The key findings and lessons learned regarding the non-food processing strategic area are summarized as follows:

- Impacts of AFIF investments in non-food processing infrastructure will be realized over longer term.
- The AFIF requirement for Memorandum of Understanding (MOU)'s among several institutions (e.g., PAMI, POS, AAFC) receiving financial support helped strengthen collaboration and alleviate duplication and overlap.
- The potential for formal and informal collaboration among non-food processing institutions in marketing and serving clients was identified during the AFIF Interim Evaluation and continues to be unrealized.
- There is a need for increased cooperation & collaboration in marketing & promotion of capacity/expertise to provide "seamless" service to clients – governments could further help to foster this collaborative approach.
- Some AFIF investments appear to have been pre-mature (e.g., PAMI crops processing) and may need ongoing operating support.
- Limited AFIF-funded HRD programming occurred for non-food processing firms.

8.0 SPECIALIZED CROPS STRATEGIC AREA

8.1 Strategic Area Description

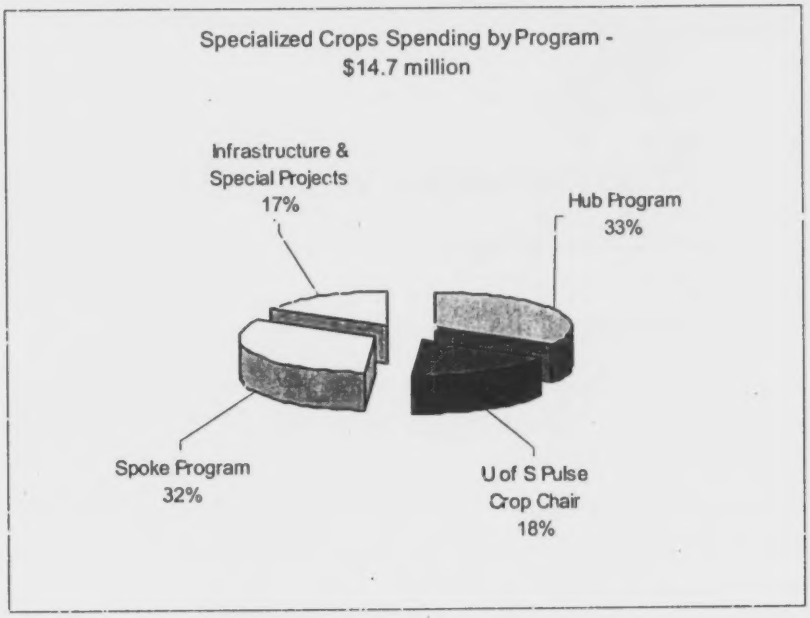
Vision: The vision for specialized crops is a market-driven crop sector in which producer and industry organizations, research agencies and governments work together to expand and diversify specialized crop production and processing in Saskatchewan.

Figure 8-1. Specialized Crops Objectives

- Develop high yielding bean and chickpea cultivars with improved disease resistance, climatic adaptation and cold tolerance.
- Develop adapted high quality cultivars and disease control technology for specific specialized crop production constraints.
- Establish joint industry-government applied research programs linked to AAFC/SIDC experimental farms to find agronomic and crop protection solutions and demonstrate specialized crop production technologies.

The AFIF Board approved a total of $14.7 million for 27 projects under the specialized crops strategic initiative. These funds included $2.4 million for research and development infrastructure and special projects funded from the AFIF Reserve Fund. These projects were distributed among the four specialized crops components as illustrated in Figure 8-2.

Figure 8-2. Specialized Crops Expenditures by Program



8.2 Strategic Area Components

8.2.1 Endowment for Dry Bean and Chickpea Research and Breeding

The objective of this initiative was:

- to develop high yielding bean and chickpea cultivars with improved disease resistance, climatic adaptation and cold tolerance.

The $2.6 million endowment is with the U of S Crop Development Centre (CDC). The 5-year average earnings from the endowment will be available annually to support the appointment of a Chair to conduct incremental research and plant breeding for these specialized crops. Projected earnings of $175,000 are available for 2000-01 but earnings will vary annually depending upon revenues in the University's long-term investment pool.

The anticipated results are increased breeding activities on dry beans and chickpeas, adaptation of cultivars to Saskatchewan conditions and increased acreage of these crops over the long term.

8.2.2 Hub Program – Cultivar Development and Integrated Pest Management

The overall objective for projects selected for funding under the Hub Program was:

- to develop adapted, high quality cultivars and disease control technology for specific specialized crop production constraints.

The intended result was increased primary research and breeding of new and improved lines of specialized crops adapted to market requirements and Saskatchewan growing conditions. A total of about $5.0 million was allocated to Hub initiatives. The main organizations involved with Hub initiatives were those with expertise in basic research and plant breeding.

8.2.3 Spoke Program – Applied Research and Demonstration

The objective of the Spoke Program – Applied Research and demonstration component was as follows:

- to establish joint industry-government applied research programs linked to AAFC experimental farms and the Saskatchewan Irrigation Development Centre (SIDC) to find agronomic and crop protection solutions and demonstrate specialized crop production technologies locally.

The focus of the spoke activities was on applied research and demonstration primarily at eight Saskatchewan sites. The intended results were increased testing, communication and adoption of new specialized crop lines and technologies. The long-term aim was increased production and sale of specialized crops. The organizations involved were public research institutions and farm industry participants.

A total of $5.1 million was allocated by the AFIF Board to implement the Spoke program as one project. A special committee was created to identify the funds required for each spoke site and to provide overall direction and administration for the project. The sites are administered either by an industry (third-party contract) delivery agency or by AAFC. Included in the spoke funds was $0.7 million for coordination and extension activities and $0.4 million for support for minor use registration of pesticides.

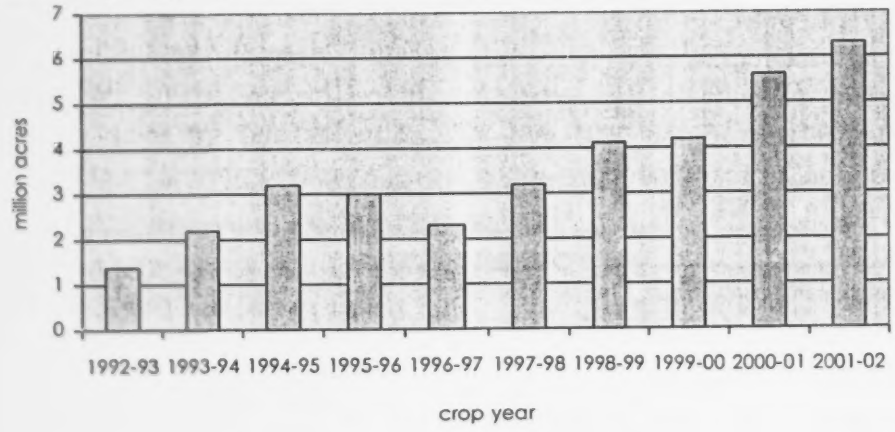
8.3 Strategic Area Status and Influencing Factors

In response to declining profitability in wheat production, Saskatchewan specialized crop area increased significantly during the period of AFIF. Specialty crop production was estimated at 2.7 million tonnes in 2001, down 28% from 2000 production, due to decreased yields, reflecting drought. Continued drought in 2002 further reduced production.

Several recent developments could affect future growth potential and profitability in the specialized crops area. These developments include the potential impact on Saskatchewan production of the recently passed 2002 U.S. farm bill, new value-adding market opportunities and financial risks associated with pulse processing.

Figure 8-3. Specialized Crops Seeded Area, Saskatchewan, 1992 to 2001

Source: 2001 Specialty Crop Report, SAFRR



The 2002 U.S. farm bill contains provisions that could negatively affect Saskatchewan pulse crop market opportunities and prices in future years. Three pulse crops (small chickpea, lentil and dry pea) are now eligible for marketing assistance loans in the United States. The program creates a price floor while allowing farmers to capture any upward price movements. [28]

Favourable loan rate margins, especially for lentil and pea crops could be an incentive U.S. farmers to increase production of these crops in some regions over the medium to longer term. There is a risk that increased subsidized U.S. production could place negative pressure on world prices and threaten the position of Saskatchewan producers in third country markets through increased competition. While there is a guaranteed margin for several pulse crops, U.S. production increases in pulses may be short-lived because of more favourable loan rate margins for traditional crops (wheat and corn), climatic conditions, agronomic factors and availability of suitable varieties.

U of S professor Hartley Furtan[29] recently forecast that U.S. producers are likely to continue producing traditional crops at recent levels, perpetuating ongoing pressures in international grains and oilseeds prices. A key implication of this scenario is that Saskatchewan farmers will continue to want to increase pulse crop acreage as a means to remain financially profitable.

Growing nutraceutical and functional food markets could provide new opportunities in the future for pulse crops.[30] Pulses crops contain nutritional components (e.g., proteins, fibre, phytochemicals, etc.) that potentially could be extracted to fulfill these new value-adding market opportunities.

Several pulse processor business failures over the past year highlight the financial and marketing risks associated with a rapidly growing production and processing capacity in Saskatchewan. Processors are feeling the strain of tight supplies related to the 2001 and 2002 droughts and shrinking margins due to competition for scarce supplies, in the face of increased processing capacity.[31]

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[28] Saskatchewan Pulse Growers, "The US Farm Bill: How Will it Impact Canada?", Pulsepoint, October 2002, p. 33.

[29] Furtan, H., "U.S. Farm Bill's Impact Less than Feared", The Western Producer, Saskatoon, January 9, 2003.

[30] Saskatchewan Pulse Growers, "Nutraceuticals and Functional Foods", Pulsepoint, October 2002, p. 20.

[31] Saskatchewan Pulse Growers, "Growing Pressure on Western Canadian Pule Processors", Pulsepoint, October 2002, p. 11.

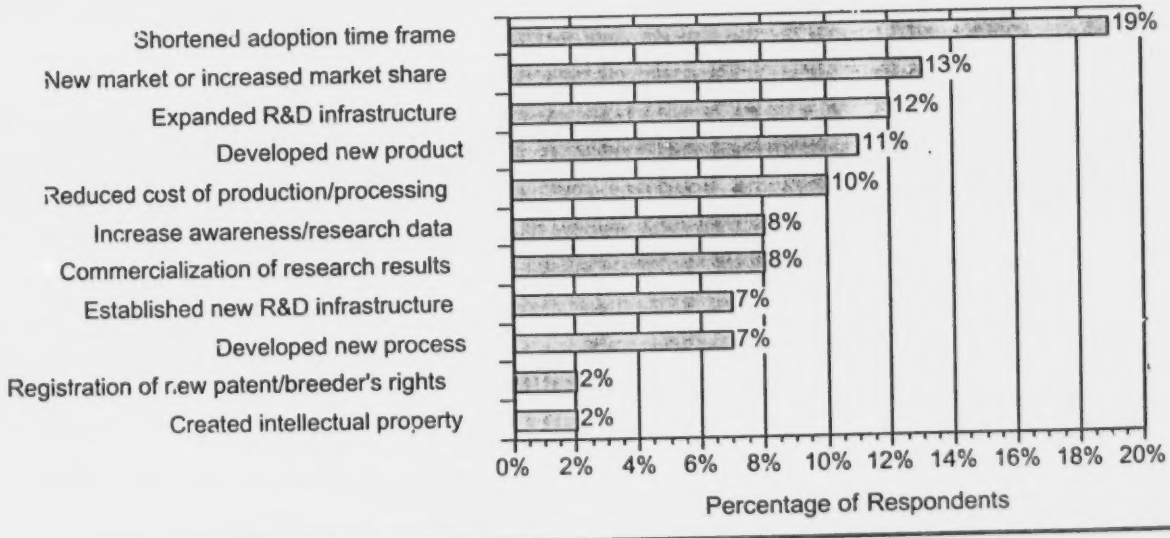
Several external factors and constraints influenced the outcome of AFIF expenditures on specialized crops initiatives. These factors included the following:

- Growing public concern about the health and safety of GMO's slowed the use of R & D in specialised crops breeding programs.
- Back-to-back prairie droughts in 2001 and 2002 slowed production growth for specialised crops, although overall acreage continues to increase.
- Saskatchewan specialised crop production has tripled during past 10 years with a major portion of the expansion occurring during the term of AFIF.
- AFIF played a timely role in fostering development of specialised crops through support to U of S CDC pulse crop breeding program.

8.4 Project Outputs

Based on our survey of project managers, most frequently mentioned outputs for specialized crops were shortened adoption time frames for new agricultural practices; new markets or increased market share; expanded R & D infrastructure; new products; reduced costs; and, increased awareness/research data.

Figure 8-4. Specialty Crops Outputs



8.5 Accomplishments and Results

Key accomplishments and results of AFIF investments in plant breeding, research, development and demonstration are as follows:

1. Research & Breeding Endowment

- Support through the AFIF endowment doubled plant-breeding human resources for pulse crops (i.e., increased the number of plant breeders to two) – facilitating registration of many new CDC pea, chickpea, bean & lentil cultivars.
- The specialized crops endowment appears to have been successful due to the clear definition of endowment objectives, precise specification of needed expertise, continuity in appointment of breeding research scientist and positioning of the Chair in a mature organization with supporting capacity and expertise.
- Existence of an endowment Advisory Committee functioning separately from the CDC Advisory Committee contributes to unnecessary administrative duplication.

2. Hub Research & Development

- Hub resources accelerated R & D on several specialty crops (e.g., spices, edible flax oil, canola quality mustard seed, etc.).
- AFIF resources also fostered development of specialty uses for some traditional crops (e.g., high erucic rapeseed).
- Improved management of honey bee disease/pest issues was another result of AFIF.
- Some research projects have led to the need for further research beyond the term of AFIF.

3. Spoke Applied Research & Demonstration

- Infrastructure investment for applied research and demonstration sites across Saskatchewan have been well received by local communities and field days were well attended by farmers.

- There is a reported potential for future use of the spoke sites, on a fee-for-service basis by farm input supply companies, and to support the plant breeding/crop registration system.

- SAFRR advised that it has agreed to provide operating support for spoke sites beyond AFIF, under the Agri-ARM program, which is now part of SAFRR.

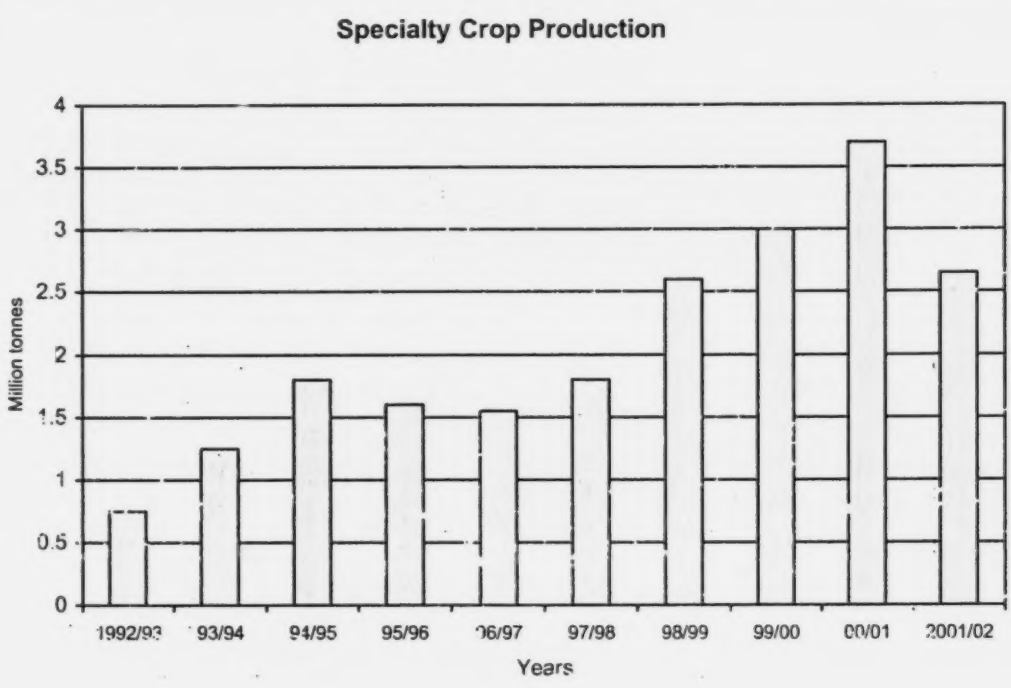
8.6 Responses to Long-Term Framework Questions

1. Has there been an increase in consistency of specialty crop production (both crop types and acres)?

Overall, there has been a steady increase in specialty crop production since the early 1990's. There has been an increase in the number of specialty crops and in the number of cultivars within species available for production. Annual variability in acreage and production continues to be the norm, reflecting production pattern shifts in response to prices and weather impacts on crop yields.

Total specialty crop acreage has increased from an average of about 2.5 million acres during the early 1990's to over 6.0 million in 2001. Production has tripled in the past ten years from just over 1.0 million tonnes in 1993 to over 3.0 million tonnes in 2001.

Figure 8-5. Specialty Crop Production, Saskatchewan



Source: Statistics Branch, SAFRR

2. Has there been a change in the number of specialized crop varieties bred for adaptability and improvement?

Interviews indicate that there has been an increase in the number of specialized crop varieties bred for adaptability and improvement, especially for the pulse crops.

3. Has there been a change in the number of chickpea and dry bean varieties bred for adaptability and disease resistance?

The establishment of the pulse crop Chair with the AFIF-funded endowment has enabled a doubling of plant breeding resources devoted to pulse crops. During the period of AFIF there were about 25 pea, bean, lentil and chickpea varieties registered, although some were well advanced in the process prior to AFIF.

4. Has there been an increase in the number of environmentally acceptable and cost efficient pest control methods? (for specialty crops and apiculture)

No evidence was found of an increase in the number of environmentally acceptable and cost efficient pest control methods for specialty crops and apiculture. A major constraint to development and registration of such products is detailed data requirements and the slow pace of federal pesticide registration approvals.

5. Has there been an increase in the number of adapted, high quality specialized crop cultivars and in the number of production acres of these crops within Saskatchewan?

As indicated previously, there has been an increase in the number of adapted high quality specialized crop cultivars and in the acreage devoted to such crops during the period of AFIF.

6. Has there been an increase in the value of specialty crop production in apiculture within Saskatchewan?

Farm cash receipts from honey production, as reported by SAFRR, have declined slightly from $17.8 million in 1999 to $15.8 million in 2001. The droughts of the past

two years, especially the wide-spread drought of 2002 have seriously reduced Saskatchewan honey production, although prices have moved higher in recent months.

8.7 Findings and Lessons Learned

The key findings and lessons learned regarding the specialized crops strategic area are summarized as follows:

- AFIF contributed to a number of specialized crops breeding projects (e.g., new pulse cultivars, canola quality mustard, edible flax, etc.).
- AFIF formed part of an ongoing funding continuum – some portion of the economic benefits from R & D are attributable to AFIF.
- increased R & D spending under AFIF has contributed to increased demand for R & D funding under other existing programs (e.g., CARDS, etc.).

9.0 SPECIALIZED LIVESTOCK STRATEGIC AREA

9.1 Strategic Area Description

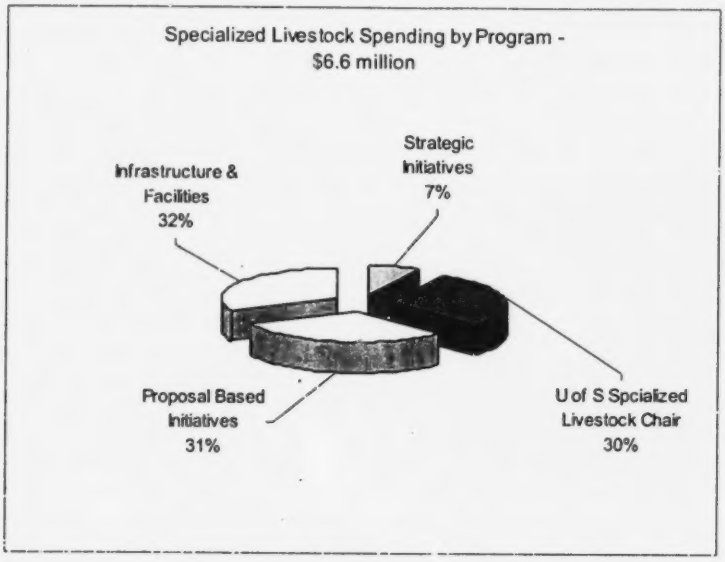
Vision: A dynamic specialized livestock industry which will become the North American leader in technology development and in the production and marketing of value-added products for diverse customers in global markets.

Figure 9-1. Specialized Livestock Objectives

- Develop an assessment of the feasibility of institutional development for the specialized livestock industry
- Identify opportunities and encourage development of value added industry for food and non-food products
- Research market opportunities, prepare market plans, promote products, provide marketing assistance to sectors
- Advance production technology
- Improve herd management, disease control and nutrition

A total of $6.6 million of AFIF funding was allocated to Specialized Livestock projects. This funding was divided among the initiatives, as shown in Figure 9-2.

Figure 9-2. Specialized Livestock Expenditures by Program



Included was $2.0 million to the Canadian Western Agribition (CWA) from the Research and Development Infrastructure portion of the Reserve Fund to construct a specialized livestock centre.

9.2 Strategic Area Components

9.2.1 Strategic Initiatives

The objectives of this initiative, which focused on institutional development, extension services and marketing research, were:

- to investigate the feasibility for institutional development in the specialized livestock industry;
- to encourage development of a value-added industry for food and non-food products derived from specialized livestock.

9.2.2 Research

The research initiatives focused on the Wester College of Veterinary Medicine (WCVM) and research facilities, as well as a veterinary chair. It has these objectives:

- to identify and research market opportunities and compile the information in a market plan;
- to promote specialized livestock products, assist industry in marketing activities, and to help sectors respond to supply/demand.

9.2.3 Innovative Specialized Livestock Program

This initiative, which was proposal-based, had the following objectives:

- to improve herd management, disease control and nutrition in specialized livestock species;
- to create a framework for Saskatchewan to become a leader in technological development;
- to provide technology transfer and extension to industry.

9.3 Strategic Area Status and Influencing Factors

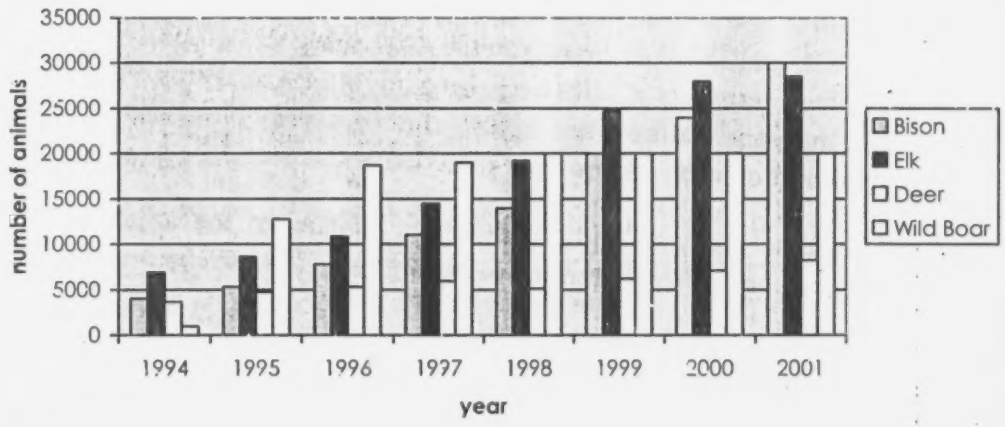
The Saskatchewan specialized livestock sector experienced significant growth during the period of AFIF. For several species, the sector also encountered Chronic Wasting Disease (CWD) and infrastructure constraints (e.g., slaughtering facilities). In 2001, an estimated 1137 specialized livestock farms and 588 farms with game farm licences for a total of 1,725 farms. This is an increase of 147% from 699 farms in 1995, comprised of an estimated 467 specialized livestock farms and 232 game farm licences.

The primary species of specialized livestock produced in Saskatchewan are bison, elk, deer (i.e., white-tail deer, mule deer, reindeer and fallow deer) and wild boar. There are also small numbers of ostrich, emu, rhea and llama/alpaca.[32] Figure 9-3

[32] Nixdorf, R., Specialized Livestock Inventory and Prices, Livestock Development Branch, SAFRR, Regina, March 2002.

illustrates growth in specialized livestock numbers in Saskatchewan between 1994 and 2001.

Figure 9-3. Specialized Livestock Inventory, Saskatchewan, 1994 to 2001



Source: Livestock Development Branch, SAFRR

Saskatchewan farmers held 27.3% of the bison in Canada in 2001, up from 12.4% in 1994. Elk numbers in the province represented 38.3% of the Canadian total in 2001, down slightly from 41.1% in 1994. In 2001, deer numbers of all species were about 12.8% of the Canadian total, while Saskatchewan had an estimated 100% of the wild boar inventory.

Average prices received by producers for unprocessed elk velvet antler have plummeted from a high of $110 per pound in 1995 to $22 per pound in 2001, reflecting the impact of CWD and excess supply. A recent Korean ban on elk velvet imports has been a critical setback for the industry.[33]

CWD is a fatal disease that attacks the nervous system of deer and elk, and could be dangerous to humans if meat from an infected animal is eaten, although there is currently no scientific evidence supporting this possibility. The disease has been

[33] Saskatchewan Elk Breeders Association, "Emergency Meetings Held", Elk Country Newsletter, July/August 2001.

recognized since the 1960's as endemic in free-ranging elk and deer. Cases have occurred in captive deer in the mid-west U.S. and recently in some 34 elk farms and 2 wild deer in Saskatchewan. These discoveries have led to development by the CFIA in cooperation with the industry of CWD surveillance, testing and certification programs for farmed and wild elk and deer.[34]

Bison prices received by producers have also declined from highs achieved in 1996. Typical of the price decline is the weighted average price at western Canadian auction sales for 2-year old heifers of $8,065 per head in 1995 compared with $1,747 per head in 2001, and $875 per head in early 2002 sales. It is reported that some of the price decline represents a shift from breeding stock to commercial stock price levels as the industry matures, but is also due to excess North American supply relative to current domestic and international demand.

Several external factors and constraints influenced the outcome of AFIF expenditures on specialized livestock initiatives. These factors included the following:

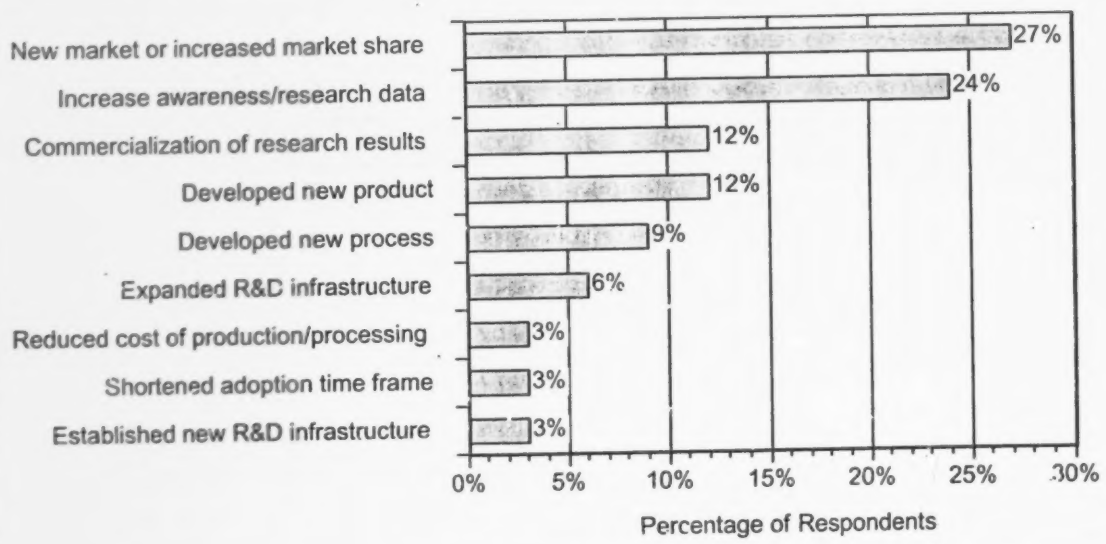
- Occurrence of CWD in western Canada has decimated elk and deer markets and prices.
- Over-production of bison has reduced prices although prospects may improve as an with improved supply-demand balance occurs over the longer term.
- Many specialized livestock species are experiencing production declines and price adjustments from higher price levels for breeding stock to lower price levels for commercial stock.
- The back-to-back prairie droughts in 2001 and 2002 negatively impacted on forage supplies for specialized livestock.

9.4 Project Outputs

Based on our survey of project managers, most frequently mentioned outputs for specialized crops were shortened adoption time frames for new agricultural practices; new markets or increased market share; expanded R & D infrastructure; new products; reduced costs; and, increased awareness/research data.

[34] Ontario Ministry of Agriculture and Food, Chronic Wasting Disease in Cervid, Toronto, September 2001.
www.gov.on.ca/OMAFRA/english/livestock/ceptor/2001

Figure 9-4. Specialty Livestock Outputs



9.5 *Accomplishments and Results*

Key accomplishments and results of AFIF investment in specialized livestock research, extension, marketing and infrastructure are as follows:

1. Extension, Marketing & Infrastructure

- Some difficulty in defining priorities was experienced during initial AFIF consultations as a result of the diverse interests represented by the various specialized livestock species groups.
- Positive feed-back was received on AFIF infrastructure initiatives (e.g., Agribition show & sale facilities).
- Some progress was achieved in development of value added products and marketing but limited success was achieved in establishment of slaughtering and processing facilities.
- SAFRR advises that there are plans to provide ongoing resources for specialized livestock extension and marketing specialists.

2. Research Endowment

- The AFIF-funded endowment for a specialized livestock Chair in the WCVM as been successful in addressing nutrition and animal health needs of various specialized livestock species.

- The key success factors are location of the Chair within a mature organization, adherence to clearly defined objectives, a functioning advisory committee, selection of expertise relevant to the issues and longer-term continuity of an appointment to the Chair.

9.6 Responses to Long-Term Framework Questions

1. Have extension services resulted in knowledge transfer to specialized livestock producers?

Informant interviews confirm that extension services provided to specialized livestock producers under AFIF have facilitated knowledge transfer. The services have been well received by producers as evidenced by the many phone calls and requests for production information as reported by the provincial specialist.

At the same time, creation of the AFIF-endowed Chair in the WCVM has been especially useful for addressing a diversity of disease and nutritional issues confronting specialized livestock producers. Emergence of CWD during the term of AFIF has been a major problem for elk and fallow deer producers and undermined the production of AFIF outputs.

2. Has there been an increase in markets available to specialized livestock producers?

Informants advise that there has been an increase in markets for bison products. At the same time, over-supply has contributed to deteriorating bison prices. There are indications of an improved market situation in the coming year although prices are expected to remain well below past prices related to the breeding stock market.

CWD has decimated markets and prices for elk and long term recovery is problematic. There was strong interest in specialized livestock production

opportunities and production growth in all species during the term of AFIF. Stakeholder interviews indicate that the industry will likely experience a period of adjustment during the coming years with some producers leaving the industry.

3. Has there been an increase in the amount and number of specialized livestock products produced?

Reliable data on the types and production levels of specialized livestock products are not readily available. Anecdotal information from stakeholder interviews indicates that some new processed products have been developed from specialized livestock sources.

While there are indications that production of bison products is increasing, no federally inspected slaughtering facility has yet been established in the province to enhance opportunities for inter-provincial and export sales.

4. Has the industry demonstrated coordination and communication?

During initial meetings concerning potential use of AFIF funds, informants reported an absence of cooperation. The diverse interests of producers of the various specialized livestock species impeded effective communication and coordination. Producers rejected a study that recommended closer integration of specialized livestock groups.

During the term of AFIF there is reported to be some improvement in relations among the various groups but they continue to be independent.

5. Has specialized livestock been accepted as a viable agricultural commodity?

Difficult market circumstances and serious disease issues are seriously limiting acceptance of specialized livestock production as a viable production alternative for most farmers. Some producers with unique production interests may see the current

depressed price situation as an opportunity to enter production at relatively low cost with hope that the market situation will improve in the future.

6. Have improved herd management practices been implemented which enhance production and disease control?

The WCVM, the AFIF-funded Chair and the SAFRR specialized livestock extension specialist have been instrumental in producing and disseminating timely information on herd management practices. Stakeholder interviews indicate that producers demonstrate a strong interest in implementing recommended practices to enhance production and disease control.

7. Has there been an improvement in specialized livestock breeding, nutrition programs and disease management?

The establishment of the AFIF Chair has been pivotal in focussing attention on improvements in specialized livestock breeding, nutrition and disease management.

Clear objectives were established for the Chair and its location within a mature organization like the WCVM allows for the provision of ancillary support services and professional collaboration. An active advisory committee has provided strategic direction for the Chair. These factors along with longer-term appointment of a Chair with expertise relevant to the critical challenges of the specialized livestock industry have contributed to success of the specialized livestock Chair.

8. Have the number of specialized livestock producers increased to meet market demand?

As noted, there has been growth in the numbers of all species of livestock, accompanied by some growth in the numbers of specialized livestock producers. However, informants advise that depressed market and price conditions for bison and elk, in particular, will likely result in significant industry adjustment with producers leaving the industry over the coming few years.

9.7 Findings and Lessons Learned

The key findings and lessons learned regarding the specialized livestock strategic area are summarized as follows:

- Support for an area such as specialized livestock requires a level of risk-taking and expectation that benefits or returns may only be realized over the longer term, and in some instances not at all.

- Establishment of the AFIF endowment in the WCVM came at a critical time to address serious disease challenges posed by the emergence of CWD, particularly in elk, in western Canada.

10.0 SUSTAINABLE AGRICULTURE STRATEGIC AREA

10.1 Strategic Area Description

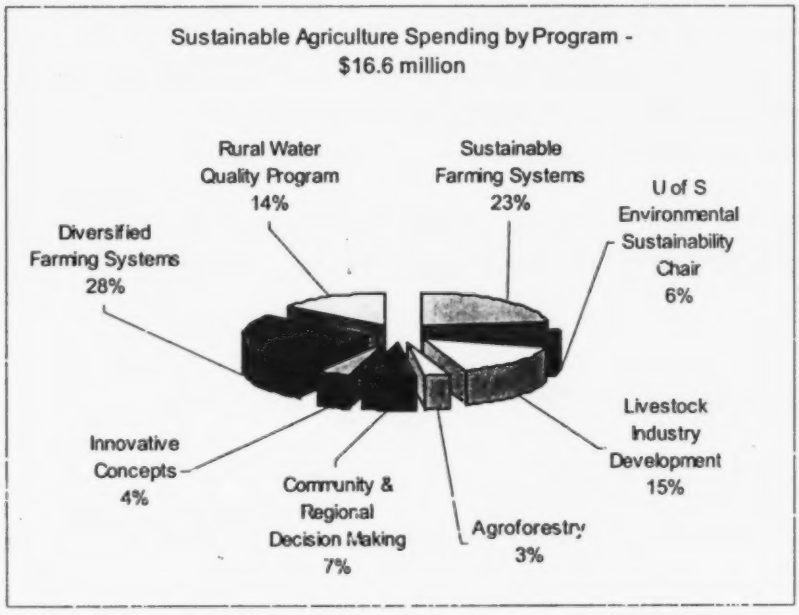
Vision: An environmentally and economically sustainable agriculture industry for the sustainable agriculture strategic area. The sustainable agriculture program is intended to benefit farmers/ranchers, agri-businesses, rural communities and rural entrepreneurs.

Figure 10-1. Sustainable Agricultural Objectives

- Research and develop sustainable farming systems
  Increase adoption rate of emerging sustainable farming practices in support of diversified Sask. farming enterprises
- Research and develop, and increase awareness and adoption of sustainable livestock management practices
- Increase awareness and adoption of a sustainable agroforestry system
- Develop and promote integrated resource management planning and innovations at community, regional individual decision-making levels for resource based economic development within Sask. agri-food industry
- Test and demonstrate tools, technology and practices for risk management through diversification
- Develop new methods, and increase diversification
- Develop new methods, and increase knowledge and adoption, for treating and protecting water quality

The sustainable agriculture strategic area had $16.6 million of funding allocated to it. The funding was distributed among the program elements, as shown in Figure 10-2.

Figure 10-2. Sustainable Agriculture Expenditures by Program


Sustainable Agriculture Spending by Program - $16.6 million
Rural Water Quality Program 14%
Sustainable Farming Systems 23%
U of S Environmental Sustainability Chair 6%
Diversified Farming Systems 28%
Livestock Industry Development 15%
Innovative Concepts 4%
Community & Regional Decision Making 7%
Agroforestry 3%

10.2 Strategic Area Components

10.2.1 Farming Systems

The objectives for this program element were:

- to research and develop sustainable farming systems; and
- to increase the adoption rate of emerging sustainable farming practices in support of diversified Saskatchewan farming enterprises.

Six projects were approved under the Farming Systems objective, with a total funding commitment of $4.9 million. This included the Sustainable Agriculture Chair endowment at the Department of Agricultural Economics, College of Agriculture, University of Saskatchewan.

10.2.2 Livestock Industry Development

This initiative included these objectives:

- to research and develop sustainable livestock management technologies; and
- to increase the awareness and adoption of current and emerging sustainable livestock management practices within the Saskatchewan agri-food industry.

The total funding allocated to the sustainable livestock initiative was $2.5 million. This encompassed seven projects, including the Western Beef Development Centre (WBDC).

10.2.3 Agro-Forestry

The agro-forestry initiative had the following objective:

- To develop sustainable agro-forestry economic diversification opportunities.

Five projects were approved for funding under the agro-forestry objective, with a total funding commitment of $0.6 million.

10.2.4 Community/Regional Decision-Making

The objective of this initiative was:

- To develop and promote sustainable integrated resource management planning at the various levels of community/regional and individual decision-making for resource-based economic development opportunities.

The total funding committed to the community/regional decision-making objective was $1.1 million. Two projects were approved under this objective.

The community/regional decision-making initiative was evaluated separately. The specific objective of this initiative was:

To develop and promote sustainable integrated resource management planning at the various levels of community/regional and individual decision-making for resource-base economic development opportunities.

Five individual decision-making projects and one community-based watershed project exist within this initiative. Within each project, specific steps and tasks were undertaken to address an important issue of relevance to a community or region. In all cases the issue addressed required some future action and needed decisions to be made to support that action. Within each of the pilot projects, specific tasks were conducted:

- gaining an understanding of the issue
- gathering the tools for assessment
- establishing an inventory of resources
- analyzing present operations
- considering future options and their associated risks/impacts
- determining a future action strategy

10.2.5 Innovative Concepts

Eleven projects were funded under the Innovative Concepts initiative, for a total of $738,000 of funding. The objective of this initiative was:

- To develop and promote integrated resource management innovations within Saskatchewan's agri-food industry that are globally competitive.

10.2.6 Diversified Farming Systems

Vision:	The purpose of this proposal-based program is to foster increased availability of decision-making methods and tools to assist producers in shifting from traditional production practices to more sustainable production systems.

Thirty-five projects were approved under the diversified farming systems program. Funding of $4.4 million was committed to these projects from the Reserve Fund.

The program objectives for diversified farming are as follows:

- To develop decision-making tools for farming that take into account a totally integrated system of knowledge and cultural practices to maximize impact for sustainable profitable production;
- To demonstrate technologies/practices that aid in diversifying farming systems in Saskatchewan;
- To increase knowledge and level of adoption by producers of new technologies/practices that aid in diversifying farming systems in Saskatchewan;
- To increase producers' ability to capture new market opportunities in the agriculture industry;
- To reduce risks associated with farm diversification;
- To increase producer confidence in adopting new technologies.

10.2.7 Rural Water Quality

Vision:	The vision for rural water quality is the elimination of water quality as a constraint to diversification of the agriculture sector.

The objectives of the Rural Water Quality Program were:

- to develop new methods for treating poor water quality and protecting water quality in rural Saskatchewan; and,
- to increase the knowledge and level of adoption by the agricultural sector of viable methods for treating poor water and/or protecting water quality in rural areas.

The target client groups are agricultural extension agencies, producers and processors in the agri-food sector, and rural communities.

The AFIF Board approved a total of $2.35 million from the Reserve Fund for the rural water quality program. The funds were distributed among nine water quality initiatives.

10.3 Strategic Area Status and Influencing Factors

The 2002 Census of Agriculture reported that zero-till seeding (no tillage prior to seeding) was used on up to 39% of land seeded in 2001. Census data indicate that

Saskatchewan farmers adopted zero-till seeding to a larger extent than farmers in any other province. There was a corresponding reduction in conventional (incorporates most of the crop residue into the soil) tillage, a smaller reduction in minimum tillage (conserves most of the crop residue on the soil surface) and a reduction of 29.3% in summer fallow acreage from 1996 to 7.7 million acres in 2001.[35]

There has been accelerated use of equipment (e.g., direct seeding), more innovative application of fertilizers and pesticides, and incorporation of plant varieties better adapted to the new tillage practices. There are both public and private benefits from adoption of more sustainable farming practices. There is less wind erosion, greater retention of soil moisture for crop use, reduced equipment and human resource operating requirements per acre and increased cropping diversification.

During the period of AFIF implementation, there was growing adoption by farmers across Canada of whole farm environmental management as a means of addressing on-farm soil, water and environmental issues. On behalf of AAFC, Statistics Canada recently conducted a Farm Environmental Management Survey to measure current farm environmental initiatives and farming practices over the previous five years (i.e., 1996 to 2001).[36]

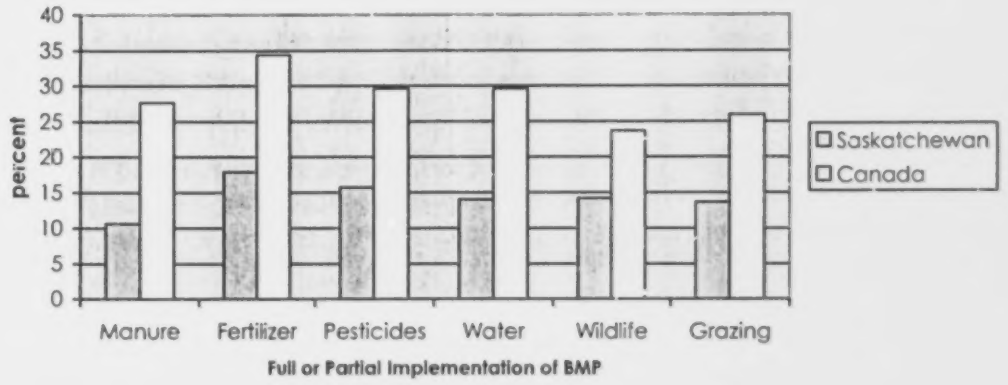
The survey indicated that only 1% of Saskatchewan farmers have a formal, written whole farm environmental plan prepared over the past five years as part of a provincial or industry program, compared with 13% of farmers across Canada.

According to the survey, Saskatchewan farmers lagged behind farmers across Canada in the implementation of best management practices for managing environmental risks associated with various agricultural practices. For example, Figure 10-3 illustrates that 10.6% of Saskatchewan farmers implemented Best Management Practices (BMP) compared with 27.7% of Canadian farmers.

[35] Statistics Canada, 2001 Census of Agriculture, Saskatchewan Release, Ottawa, May 2002. www.statcan.ca/english/agcensus2001/first/regions/farmsk.htm

[36] Statistics Canada, Farm Environmental Management Survey 2001, Ottawa, October 2002.

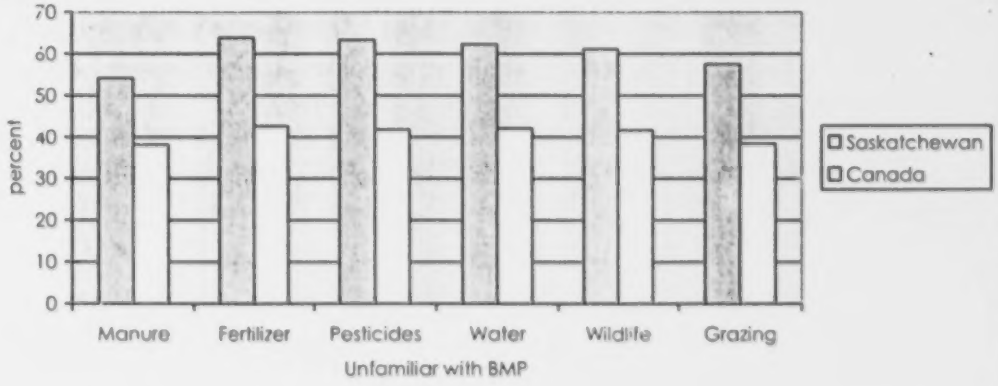
Figure 10-3. Full or Partial Implementation of Best Management Practices



Source: Statistics Canada. Farm Environmental Management Survey 2001

At the same time, Figure 10-4 illustrates that 54.1% of Saskatchewan farmers were unfamiliar with BMP for their region compared with 38.1% of all Canadian farmers and the type of farming in the province.

Figure 10-4. Farmers Unfamiliar with Best Management Practices



Source: Statistics Canada, Farm Environmental Management Survey 2001

Apparent differences in awareness and adoption of BMP may be partly explained by the proximity to urban centres of many farmers in other regions of Canada, and the corresponding greater focus on environmental management issues in other parts of Canada, as compared with Saskatchewan farmers.

According to the Census of Agriculture, Saskatchewan has about 40% of all farmland in Canada. In terms of adoption of other significant resource management practices, the Environmental Management Survey, indicated that, as a proportion of the Canada total, Saskatchewan farmer's have:

- 32.9% of the area of grassed waterways;
- 18.4% of the miles of riparian (waterfront) area;
- 28.8% of the area of farmstead shelterbelts/windbreaks; and,
- 19.4% of the miles of field shelterbelts/fencerows.

Comparison of the relative adoption percentage of these various practices with the proportion of Saskatchewan farmland is only one measure of performance. More relevant measures would be the comparison of adoption levels with goals reflective of the need for adoption of such practices in the province. Unfortunately, no evidence of such goals could be found.

While Saskatchewan farmers became more aware of the importance of sustainable practices during the term of AFIF, greater efforts will be needed in the future to close evident environmental performance gaps indicted by the national survey.

Increasing consumer interest in organic foods provided a growing production opportunity for some farmers during the period of AFIF (although organic production was not an AFIF priority). The 2001 Census of Agriculture reported that Saskatchewan ranked first of all the provinces in production of certified organic commodities. Some of 773 Saskatchewan farms reported organic production, more than 33% of the Canadian total. About one-half of Canada's organic field crop farms were located in the province. The shift to organic farming for some farmers represented a further value-adding, diversification strategy away from traditional, low margin grains and oilseeds crops.

Several external factors and constraints influenced the outcome of AFIF expenditures on sustainable agriculture initiatives. These factors included the following:

- Debate on the Kyoto Accord has focussed public attention on impacts of global warming and climate change; and, the potential future role of agriculture in carbon sequestration.

- The Walkerton and North Battleford water contamination cases stimulated public concern about the importance of water quality and increased farmers' awareness of water quality issues.

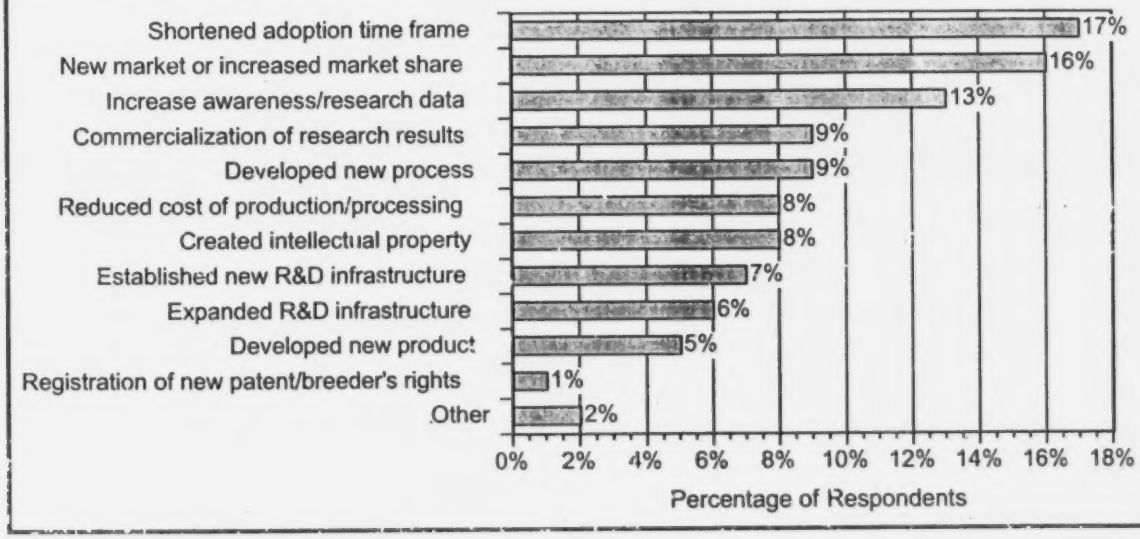
- The prairie droughts of 2001 and 2002 focussed attention on water supply and water conservation/management issues, as well as on drought-related soil degradation concern.

- The incidence of significantly reduced drought-induced wind erosion damage, compared with damage experienced in previous drought years amply demonstrated the importance of soil conservation and sustainable farming practices, adopted by many Saskatchewan farmers over the past ten years.

10.4 Project Outputs

Based on our survey of project managers, key outputs from sustainable agriculture were shortened adoption times for new agricultural practices; new or increased market share; increased awareness or research data; commercialization of research results; new products/intellectual property; and, reduced costs.

Figure 10-5: Sustainable Agricultural Outputs



10.5 Accomplishments and Results

Key accomplishments and results of AFIF investments in sustainable agriculture initiatives are summarized as follows:

1. Sustainable & Diversified Farming Systems

   - AFIF projects were implemented by both public and private organizations that demonstrated a number of sustainable agricultural practices (e.g., manure management, conservation tillage, etc.).
   - Projects impacts were felt at the farm level and helped to advance the continuum of change to more sustainable farming systems.
   - Some demonstration work begun under AFIF will continue in the short-run at spoke sites funded under the SAFRR-funded Agri-ARM program.

2. Livestock Industry Development

- The WBDC is facilitating advancement of the Saskatchewan cow-calf and forage sectors, in turn supporting agricultural diversification.
- The modernized Termuende farm is proving to be useful as an applied research and demonstration facility.

3. Rural Water Quality

- AFIF support for rural water quality applied research, demonstration, and preparation of technology transfer information materials proved to be very timely for industry adaptation.
- Initial interest in water quality measures was low but changed significantly with the water quality problems identified in the Walkerton and North Battleford cases.
- Excellent information materials have been prepared with AFIF financial support but will eventually become dated.

4. Endowment Chair

- The AFIF-funded sustainable agriculture Chair was initially occupied for short period of time, contributing to Canada's negotiating team on the Kyoto Accord, but is currently vacant.
- Review of the terms of reference of the endowment chair, including objectives, is warranted potentially leading to re-definition or re-allocation of resources.

10.6 Responses to Long-Term Framework Questions

1. Have there been changes in methods that Saskatchewan farmers use in crop production that result in better land management and sustainability?

There have been changes in methods used by Saskatchewan farmers in crop production, leading to improved land management and more sustainable land use.

For example, the 2001 Census of Agriculture indicates that the pre-seeding practice of "no tillage" increased by 86.1% over the 1996 Census; from 7.3 million acres to 13.5 million acres in Saskatchewan. Conventional tillage that incorporates most crop residue into the soil declined by 24.8%.

At the same time, total summer-fallow acreage declined by 25.2% from 11.0 million acres in 1996 to 7.7 million acres in 2001. Chemical fallow increased by 31.4% from 0.9 million acres to 1.2 million acres while summer-fallow practices involving tillage only and tillage in combination with chemicals declined by 37.5% and 31.4% respectively.

The foregoing data indicate that Saskatchewan farmers are adopting direct seeding such as air-seeding and chemical weed control practices that do not disturb the soil prior to seeding. Increased adoption of continuous cropping practices in many areas of the province is eliminating summer-fallow from crop rotations. These practices improve soil moisture conservation, as well as soil structure and organic matter content. In turn, risks of wind and water erosion are being reduced which enhance long-term soil and agricultural sustainability.

The beneficial impact of improved land management practices was demonstrated during the back-to-back droughts experienced during the 2001 and 2002 cropping seasons. While there continued to be some soil drifting in the brown soil zone where summer-fallow continues to be practiced, wind erosion damage in most other areas of the province was minimal.

Unfortunately, the 2001 Census also indicate that some desirable soil conservation practices are declining. For example minimum tillage, that retains most of the crop residue on the surface declined by 8.1% between 1996 and 2001. While the use of crop rotations, strip cropping and contour cropping practices all showed declines, these may echo, to some extent, the substantial increase in adoption of no tillage practices. In contrast, winter crop cover and permanent grass cover increased 92.7% and 14.0%, respectively between 1996 and 2001 – both practices that help reduce wind and water erosion.

Overall, Census indicators confirm that there were several positive developments towards adoption of more sustainable farming practices during the period of AFIF. However, it is evident from several negative trends that there is a need for continued promotion and demonstration of sustainable farming practices to Saskatchewan farmers in the future, building on the successes of AFIF.

2. Have the number of privately owned agri-forest acres increased?

There are no data available to assess trends in the area of privately owned agri-forest. Census data indicates the total area of forested land within farms; however, there is no indication on the amount of the forested land that is managed for agri-forest purposes. Sales of forest products from Saskatchewan farms remained constant at $5 million between 1995 and 2001.

Information obtained during the interview phase of the research, suggests that there is growing interest, especially in the northern agricultural fringe areas, in the potential for farm-based forestry. There is interest in production of rapid growing poplar species for wood-based alcohol production; however, the limited factor continues to be the lack of market and processing facilities on Saskatchewan. AFIF helped advance interest and research in agri-forestry that will continue under future provincial initiatives in northern Saskatchewan.

3. Have informed decision making projects had long-term benefits for communities that have implemented the process?

A separate evaluation of AFIF projects for advancing informed community-based decision making processes indicated that few long-term benefits were realized. The projects endeavored to advance principles of integrated resource management as a means of fostering community and rural development. These were recognized as worthy principles; however, conflicting interests within the communities and the lack of time and resources to resolve conflicts contributed to limited success of the projects.

The key lesson learned from these projects is that a community decision-making processes and, in turn, community cohesion can be advanced if attention can focus on a concrete economic development opportunity. Abstract community planning processes without the prospect of a specific focus, will not last for long. At the same time, the success of such processes depends on the existence of community leadership, individuals prepared to step forward to provide inspiration and direction.

4. Is the agriculture sector adopting land management practices that enhance or protect water supplies?

The 2001 Census of Agriculture indicates that there was a 7.6 % decline in use of grassed waterways, and an 18.2 % decline in windbreaks and shelterbelts since the 1996 Census. The negative shifts in the foregoing practices indicate increased risk of water and wind erosion that can have undesirable impacts on water quality.

These indicators further confirm that there is a need for continued promotion and demonstration of sustainable farming practices to Saskatchewan farmers in the future in order to minimize water erosion and, in turn, enhance and protect water supplies.

5. Is the agriculture sector adopting land management practices that enhance or protect water supplies?

Several sustainable agriculture projects contributed to the development and demonstration of precision farming tools. The survey of project managers provided information that future economic impacts for adoption of precision farming practices could be very large in terms of reduced costs and more efficient farm input use.

The GIS and computer-based mapping technology involved in such systems is complex and likely beyond the inclination and means of many farmers for years to come. Nevertheless, funding for projects in this area has successfully demonstrated the potential use and impact of precision farming systems.

6. Is the agriculture sector adopting land management practices that enhance or protect water supplies?

Most of the projects on the sustainable agriculture strategic area were of an applied nature, demonstrating the use of known research results and technologies.

Based on our interviews, we have concluded that these types of projects, by their nature are very useful for bridging the gap between pure research and commercialization. Examples of such successful technology transfer projects were

those related to manure management, crop rotations and forage management. The results of these technology transfer projects were shared with many producers through field days and tours. Evaluation feedback indicates that these types of projects are useful for diminishing constraints to technology adoption.

7. Is the agriculture sector adopting land management practices that enhance or protect water supplies?

No direct survey data is available to respond to this question. However, interviews with project managers indicate that there has been a high level of producer interest in various technologies for improving water quality for domestic and livestock use.

AFIF assisted with the costs of producing a number of extension materials and guides to assist farmers in diagnosing water quality problems and in assessing suitable treatment options. These materials are in high demand and federal and provincial officials are receiving many questions from producers in regard to water quality issues. We were advised that producer interest in water quality issues increased significantly following the Walkerton, Ontario and North Battleford, Saskatchewan cases of contaminated water.

Water quality initiatives under AFIF will terminate with the end of AFIF. Existing information materials will be available for several years but, in time, the information will become dated. Consideration will need to be given to future measures for addressing water quality concerns on Saskatchewan farms.

8. Is the agriculture sector adopting land management practices that enhance or protect water supplies?

Stakeholder interviews indicate that the agriculture sector is beginning to appreciate the importance of using effective water treatment in agricultural production and diversification. Water quality for livestock production, one of the principle means of agricultural diversification, is increasingly being recognized as important for maximizing animal health and weight gains. Research conducted with AFIF funds demonstrated the economic importance of sound water quality to animal health.

Stakeholder feedback indicates that more research and demonstration work will be needed in the future to address water quality and water supply issues facing Saskatchewan farmers.

10.7 Findings and Lessons Learned

The key findings and lessons learned regarding the sustainable agriculture strategic area are summarized as follows:

- Adoption of sustainable agricultural practices is a long-term process – AFIF has been one of several tools to foster adoption in recent years (e.g., National Soil Conservation Program, Save Our Soils, Green Plan).
- While many producers are aware of benefits achieved by adopting sustainable farming practices and protecting water quality, there continues to be a need for future initiatives to facilitate awareness, applied research and technical assistance.
- The role of the sustainable agriculture Chair was not well defined, as AFIF sustainable agriculture initiatives were very broad. A potential role of the U of S sustainable agriculture Chair in the future could be research in support of establishment of future strategic directions and priorities for sustainable agriculture programming.

11.0 OVERALL PROGRAM EVALUATION FINDINGS

11.1 Objectives

Figure 11-1. AFIF Overall Objectives

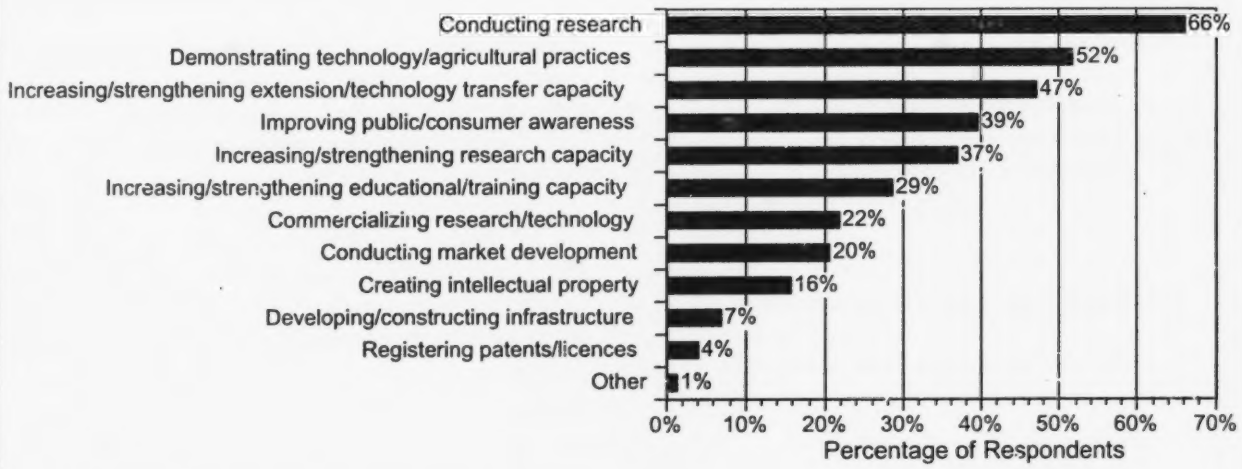
- Support the development of emerging primary and value added agriculture sectors in Saskatchewan by providing assistance for research, development and infrastructure;
- Facilitate transition to a more market driven economy for the Saskatchewan agri-food industry by enhancing diversification, supporting research and development, and encouraging Saskatchewan farmers and rural residents to create economic opportunities and jobs; and,
- Support Saskatchewan's commitment to do its part in meeting Canada's targets in agri-food exports.

11.2 Responses to Long-Term Framework Questions

1. Have the AFIF program activities resulted in the creation of additional sustainable capital and human resource infrastructure which will enhance the development of the Saskatchewan agri-food industry?

Capacity building was one of the key outputs of AFIF in all strategic areas, except sustainable agriculture. Figure 11-2 and 11-3 illustrate the types of activity and key outputs resulting from AFIF projects. Many projects produced more than one output.

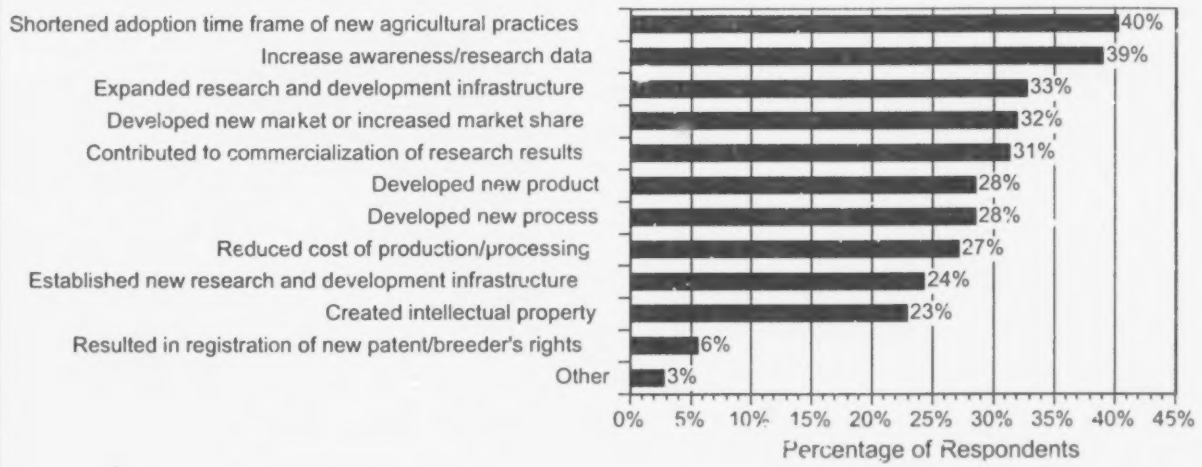
Figure 11-2. Key Activities Undertaken to Achieve Objectives



A total of 47% of respondents in the survey of AFIF project managers indicated that enhancing extension/technology transfer capacity was a key activity for achieving their project objective (Figure 11-2). At the same time, 35% and 29%, respectively, of respondents advised that their project activities involved increasing or strengthening research or educational capacity.

A total of 32% of survey respondents thought that expanded research and development infrastructure was a key project output, while 24% thought that their AFIF project helped create new research and development infrastructure (Figure 11-3).

Figure 11-3. Key Outputs to Date from AFIF Projects

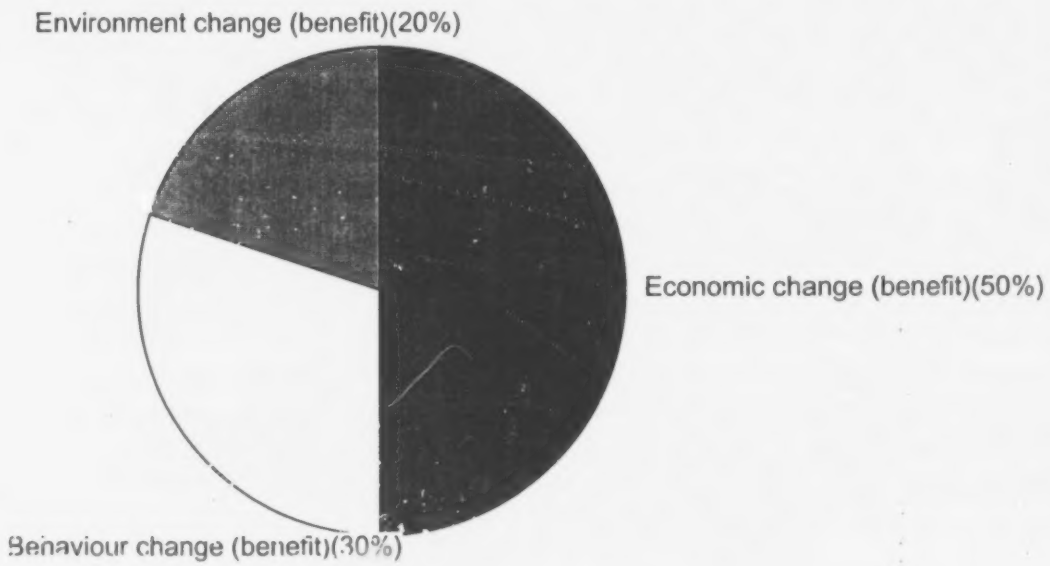


2. Has AFIF enhanced the economic performance of the Saskatchewan agricultural and agri-food industry?

Economic performance means improved efficiency, reduced costs, increased output, market/industry growth or creation of economic wealth/value. Many factors have contributed to the economic performance in Saskatchewan's agricultural and agri-food industry. At the aggregate, total industry level, it is not possible to accurately attribute certain economic performance to the AFIF program activity. However, indicators of AFIF's impact on economic performance are evident at the individual project level. Examples of AFIF project economic enhancements include: better adapted, more disease resistant pulse crop varieties; improved post-harvest handling and storage of saskatoon berries to extend shelf life; improved use of peas in hog feed rations; greater knowledge of specialized livestock diseases, pest management in honey bees; to name just a few.

A total of 50% of AFIF survey respondents advised that the main benefit of their project was economic change (Figure 11-4).

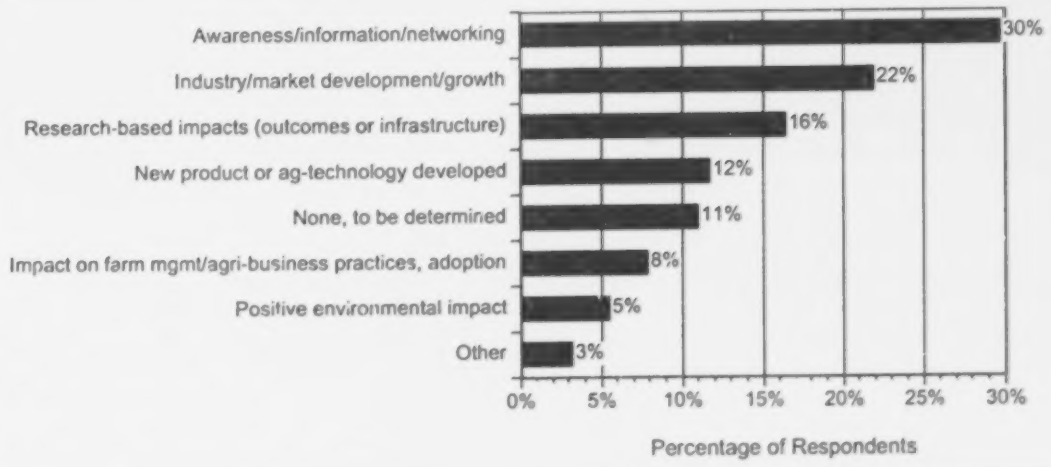
Figure 11-4. Distribution of Benefits from AFIF Projects



A total of 28% of survey respondents advised that their project resulted in development of new products or processes (Figure 11-2). Some 27% of survey respondents noted that one of the outputs of their project was reduced cost of production or processing. At the same time 23% of respondents indicated that their project created intellectual property, while 6% indicated that new patents or breeder's rights had been registered. Both of these outputs should contribute to creation of economic value in the future.

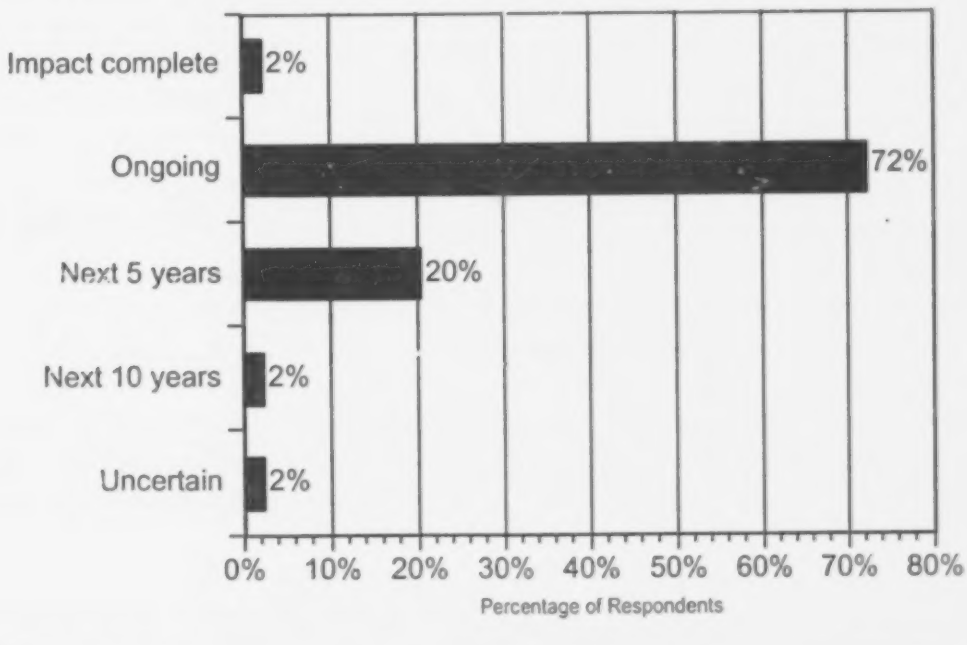
The second, most frequent impact of AFIF projects reported by managers is industry/market development/growth (22% of survey respondents Figure 11-5).

Figure 11-5. Impact of AFIF Projects



Seventy-two per cent (72%) said that the impact will be ongoing, while 20% felt the impact would be felt over the next five years (Figure 11-6).

Figure 11-6. Time Period for Realization of AFIF Impacts



3. Has the technical expertise of Saskatchewan's agri-food industry been enhanced as a result of AFIF programming?

AFIF programming has enhanced the technical expertise of Saskatchewan's agri-food industry in several of the strategic areas.

For example, in biotechnology, training of up to 20 biotechnologists per year at SIAST is now possible; there is potential for training of graduate students under the biotechnology endowment.

In specialty crops, the number of plant breeders for pulse crops has doubled. There is new expertise in specialty livestock diseases and nutrition through the WCVM endowment.

New expertise has been established in vegetable production, post-harvest fruit handling and storage and at applied crop research spoke sites throughout the province.

Research, demonstration, technology transfer, improved awareness and research/education capacity building were key activities (Figure 11-2) reported by managers for meeting project objectives – all, of which contribute to enhanced R & D and technical expertise.

4. As a result of program initiatives, have Saskatchewan producers and processors adopted new technologies, products, processes and practices? (Through information technology, diversification, research, etc...)

Examples of adoption of new technologies by the industry include the following:

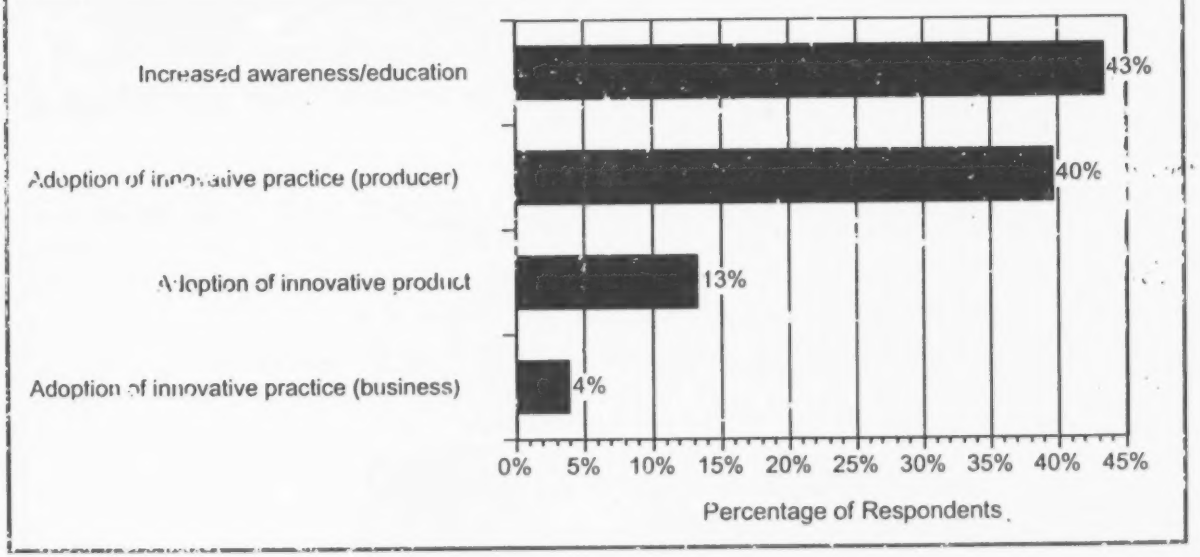
- minimum tillage practices through field days and extension activities;
- vegetable production practices under several horticulture projects;
- post harvest chilling and handling to extend the fresh product marketing season for saskatoons; and,
- disease control practices for bees.

In food processing, a number of firms have developed new products and adopted processing technologies leading to successful marketing of new products.

In feed processing, new feed products based on use of field peas and canola meal for pig rations have been successfully adopted, providing significant economic benefits for feed processing and hog industries

Project managers report that increased awareness and education, and adoption of innovative practices were the main behavioural changes from AFIF to date (Figure 11-7).

Figure 11-7. Behavioural Changes Stemming from AFIF



5. Has the AFIF program supported projects that address the emerging priority areas within Saskatchewan agriculture, as defined by agricultural representatives and employees of federal and provincial government programs?

AFIF identified emerging priority areas through federal, provincial and industry consultations. Eight strategic areas were identified initially followed by funding for five additional areas under the reserve fund. The consultation process was thorough and inclusive although some stakeholders thought it was too time consuming.

A key basis for discussions was strategic priorities identified in the SAFRR vision for the year 2000.

AFIF adjusted priorities throughout the term of the program, although not as much as it might have. Some initiatives such as human resources and new ideas development under non-food processing were changed or addressed when they did not meet AFIF objectives. Others, such as information technology and food processing human resources training were not adjusted when evidence indicated objectives were not being achieved.

6. Has the AFIF program contributed to Saskatchewan agriculture's ability to move toward a more market-driven economy – with a greater dependency on market incomes?

AFIF has contributed to creation of market-oriented diversification opportunities with significant economic potential in several areas. However, AFIF fell short of its objective to move Saskatchewan to a more market-driven economy. The AFIF program chose to spend the majority of its resources on research, development and on the building of infrastructure. Few resources were applied to areas like marketing, exporting and other areas that are needed to create a product-based agricultural emphasis rather than a commodity-based agricultural focus.

AFIF's guiding principles prevented the program from directly supporting farmers and businesses in marketing, commercialization and value-added processing. An emphasis on research meant that AFIF experienced an imbalance between funding for research and funding for development and commercialization.

11.3 Conclusions and Lessons Learned

1. ***AFIF has been a key contributor to research and development in targeted agricultural sectors within Saskatchewan.***

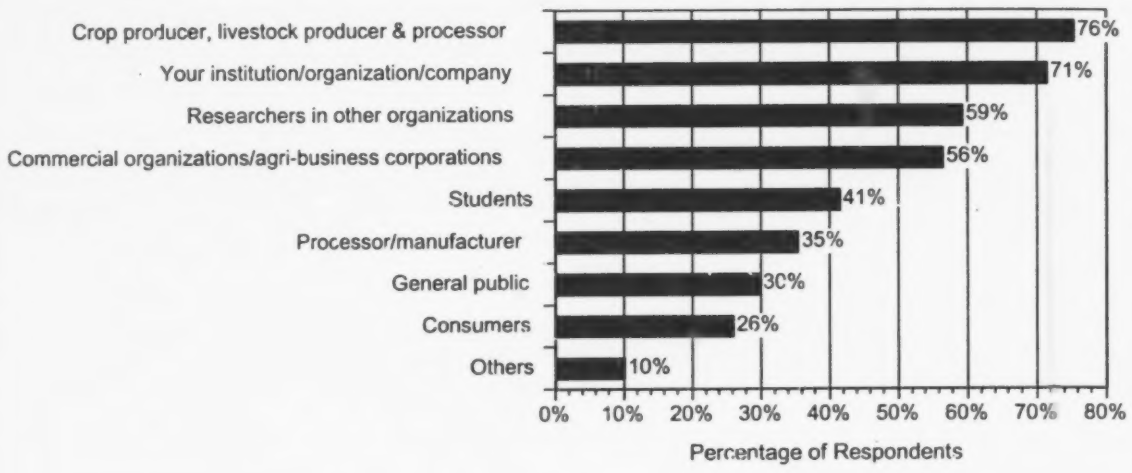
AFIF has contributed $48 million to the creation of infrastructure that will advance the capacity of the agricultural sector both today and into the future. Another $41 million has been committed to research and development with the belief that these types of investments will result in the province's ability to take advantage of added capacity and move toward a more market driven agricultural economy.

Infrastructure	51%
Research & Development	44%
Value-Adding	2%
Administration	3%

2. ***Project fund recipients report that AFIF programs have reached a large target audience of producers, processors, agricultural organizations, researchers, policy makers, students and consumers.***

Survey respondents indicate 32,000 farmer contacts have been made over the life of the Agreement. Contacts included participants in demonstration days, recipients of communication and information tools and users of new technologies.

Figure 11-8. Survey Respondent's Allocation of Project Benefit*



* More than one beneficiary could be identified by each of the respondents.

3. ***Project managers report that AFIF has generated a number of benefits to the Saskatchewan agricultural industry.***

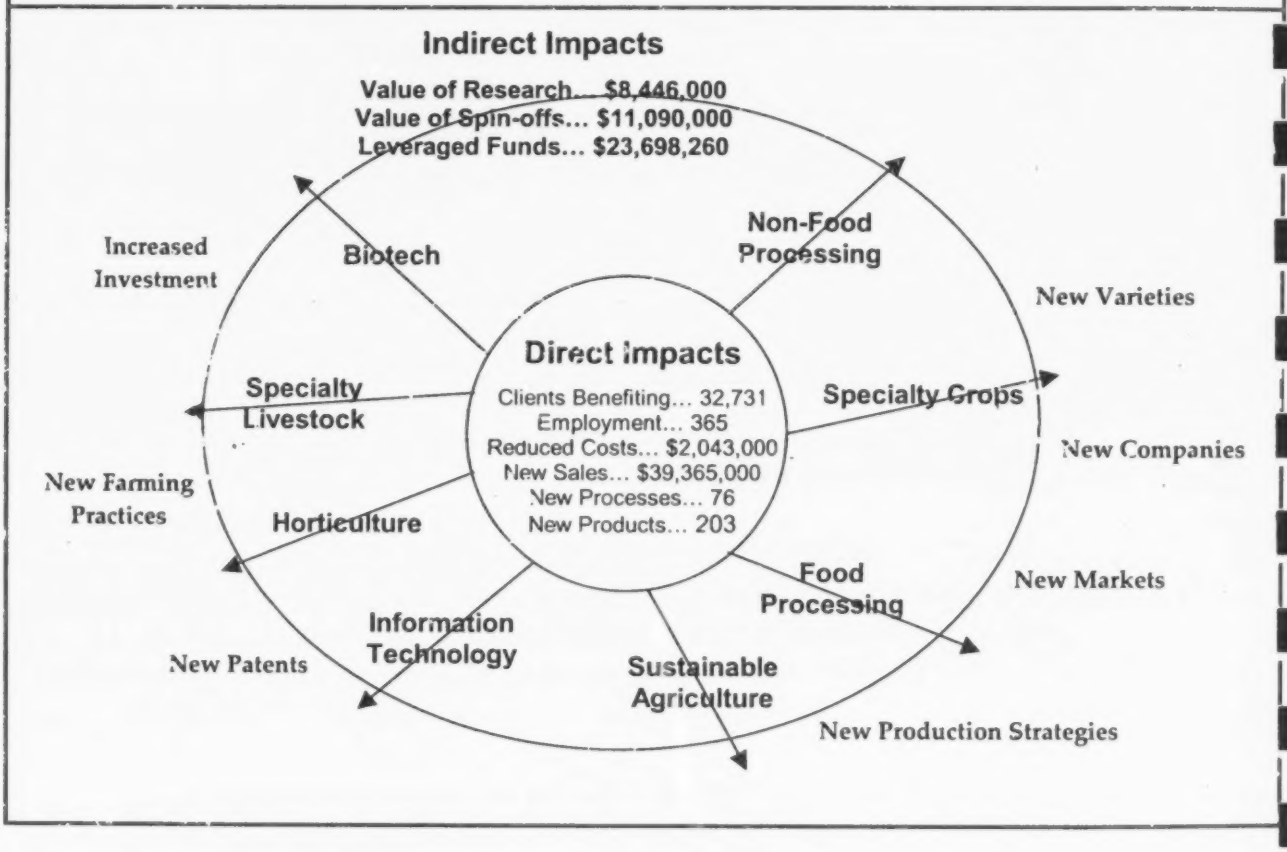
Reported benefits include behavioural and environmental change as well as overall economic advancement. Many of the projects were designed to introduce new management and production practices and project fund recipients report that farm managers have embraced some of these changes.

4. ***By its very nature, research and development requires a significant amount of time to elapse before measurable impacts can be documented.***

The AFIF program invested primarily in research, development and infrastructure. The results, outcomes and impacts of this type of activity are normally realized over the long-term. To document the initial impacts that can be measured, the concept of 'Concentric circles of impact' has been used. Direct, quantifiable impacts are found in the centre of the circle model. These are easily measured and many of the direct impacts can be identified in the short-term.

However, just as a pebble is dropped into a pond, there are ripple or spin-off benefits. These can be considered to be indirect benefits. Often, they are more difficult to measure. On the outside of the circle model, a number of long-term benefits have been identified. At this point in the life of the AFIF program, the full impact of the program is unrealized. It is assumed, that over time, the full benefit of AFIF investments will be felt by the agricultural community.

Figure 11-9. Direct and Indirect AFIF Impacts



5. ***A low level of additional research dollars has been leveraged by current AFIF investments.***

It is true in programs like AFIF, where the investment emphasis has been on research, development and infrastructure, that it is somewhat difficult to attract private sector investment. The majority of encouraging investment of incremental achieved by AFIF was in the ability to leverage other government resources. Overall, AFIF has had very limited success in leveraging financial resources with a reported leverage rate of about $1 of AFIF resources to $0.25 of other sources of funds. Other programs such as WEPA and CARD have demonstrated leverage rates of $1 of program funds to $13 or more of other funds.

AFIF Investment	Additional Funds Leveraged
$91,000,000	$23,700,000

Some of the surveyed project managers reported that they did not have enough time to identify leveraged sources of funds. The timeframe to prepare and submit proposals was very short in order to meet the AFIF submission deadlines. Leverage is one measure of cooperation and collaboration in projects. A low leverage rate is an indicator that proponents either did not collaborate with others or had insufficient time to develop jointly funded proposals.

6. ***AFIF allocated the majority of the investment funds early in the life of the program, over an eighteen month timeframe. Rapid commitment of research, development and infrastructure funds has resulted in some unwanted outcomes.***

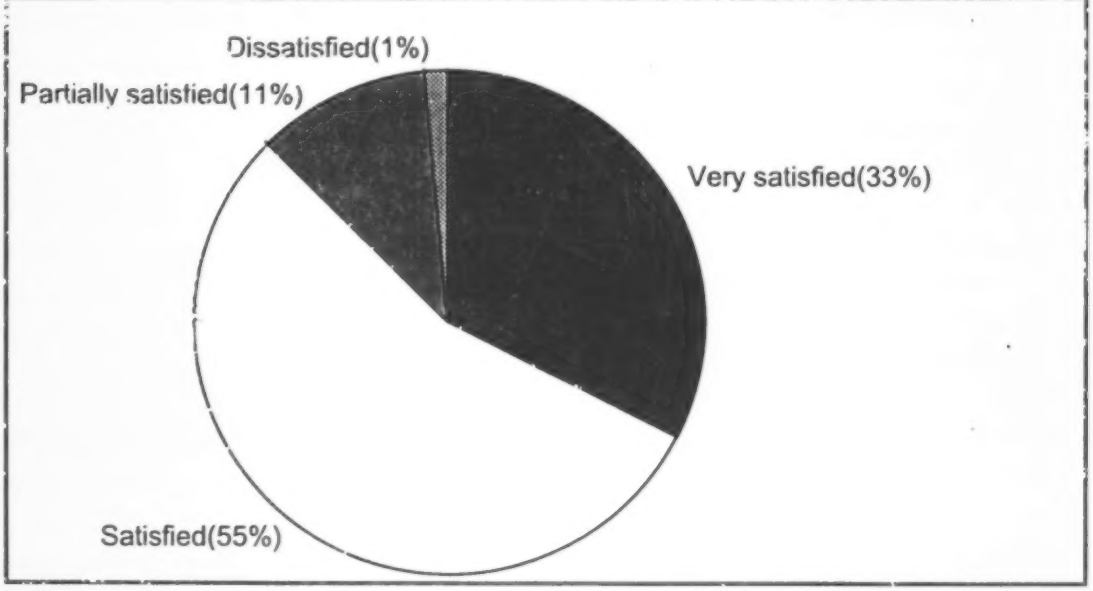
In order to make funding decisions in a short period of time, a number of administrative and management issues were necessarily compromised. Comprehensive due diligence which included market demand, service potential and feasibility analysis was not thoroughly completed for several large infrastructure projects. The annual AFIF business plan and the regular review of such a plan were not completed. Total leveraged funds realized were low as project applicants reported that they didn't have the time to develop a plan to access these leveraged funds. With the majority of the resources allocated at the beginning of the program,

it was difficult for AFIF to respond to emerging areas of concern or new programming issues throughout the life of the program.

7. ***Both participants in the AFIF program and stakeholders that have been involved with AFIF report a high level of overall satisfaction with the efficiencies of the program.***

Direct AFIF administrative costs are approximately $2.8 million or 3% of the overall Fund. Administration of Agriculture and Agri-Food Canada Research Branch projects and administration of the University of Saskatchewan endowment and research chair programs total another $3 million. There are undocumented administrative costs that have been incurred by both the federal and provincial governments as they have managed and implemented the AFIF Agreement. Based on estimates of time and resources allocated by government administrators and project managers, it is estimated that these costs could represent as much as another $4 million. Overall, administration of the program has been maintained at under $10 million which compares very favorably to other funding programs of this nature.

Figure 11-10. Project Manager Satisfaction with Administration



8. ***AFIF had three key goals. Direct AFIF investment focused on the first goal and assumed that the second and third goal would be met as a result of project outputs and spin-off benefits.***

Goal #1 To support the development of emerging primary and value-added agriculture sectors in Saskatchewan by providing assistance for research, development and infrastructure needs.

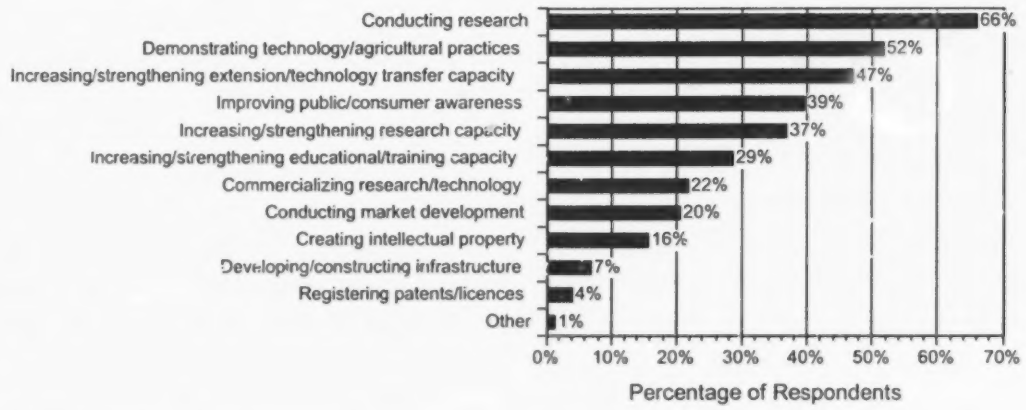
Some 95% of the available AFIF financial resources were allocated to projects that addressed research, development and infrastructure needs.

Goal #2 To facilitate transition to a more market-driven economy for the Saskatchewan agri-food industry; by enhancing the diversification of the Saskatchewan agri-food industry, supporting research and development in the Saskatchewan agri-food industry; and encouraging Saskatchewan farmers and rural residents to create economic opportunities and jobs.

Goal #3 To support Saskatchewan's commitment to do its part in meeting Canada's targets in agri-food exports and pursuing a market share of at least 4% of global agriculture and food trade.

Direct investment in the latter two goals was limited to less than 5% of the overall Fund (e.g. specialized livestock marketing, fruit industry development, access to iRAP, etc.). The AFIF Board chose to invest in research, development and infrastructure assuming that improved market potential and greater exports would occur as a spin-off benefit at a later date. Only time will tell if this philosophy will achieve the desired results.

Figure 11-11. Spending Breakdown by Project Activity



9. Self-Sustainability is an unrealistic goal for most emerging and developing industry organizations.

AFIF supported and promoted the creation of several organizations that represent emerging sectors of the agricultural industry. (i.e. Saskatchewan Nutraceutical Network, Western Beef Development Centre, etc.). It takes time to build a financial base, a supportive membership, a menu of programs and services and the ability to generate enough operating capital to maintain an organization. Organizations that represent emerging and developing sectors have not had enough time to establish self-sufficiency.

The AFIF funding principles do not allow for on-going financial support for these developing agencies and organizations.

"Funding for infrastructure and institutional development may include start-up capital and initial operations but not commit long-term government funding."

As a result, the conclusion of AFIF will leave several organizations without on-going financial support. These groups will need to reassess resource options, create new alliances or find funding from other sources, or they will have to cease operations.

10. AFIF used a broad definition of industry when choosing Board representation.

In the Strategic Overview of the AFIF program, the make-up of the Board of Directors is described: "The Agri-Food Innovation Fund is managed by a 12-member Board of Directors with the majority of representation on the Board from industry." By including representation from the University of Saskatchewan as industry representation, a greater focus was placed on a key function of the University - research and development, (AFIF's Goal 1). This reduced the focus on marketing and commercialization, (AFIF's Goals 2 and 3).

12.0 RECOMMENDATIONS

The following recommendations flow from the analysis of data collected through the process of final evaluation. The first nine recommendations are applicable to the design and implementation of future programs related to the agriculture and agri-food industry. The last three recommendations are offered to provide immediate direction to the current Board of Directors of the AFIF program.

Recommendations with Potential for Future Action

Recommendation 1:

That in the future, more emphasis and priority should be given to market-driven initiatives designed to support the adaptation of Saskatchewan agriculture toward a more market-driven industry.

Rationale:

AFIF contributed to the overall goal of agricultural adaptation in Saskatchewan. The need for adaptation has grown out of rapid change in the industry – from the production of commodities to the implementation of the value-chain concept where agricultural producers increase their profitability through diversification, value-adding, and commercialization of innovative ideas. Farmers must increase profits though new management, production and marketing practices. Scientific research, development and infrastructure alone will not cause adaptation and change toward a market-driven agricultural sector. There continues to be a strong need for programs and financial resources (e.g. market development, commercialization, etc.) that support the agricultural industry as it moves from a commodity-based sector to a product-based agricultural sector.

Recommendation 2:

That at the commencement of programs such as AFIF, program funding that is targeted at the issues of marketing, value-adding and diversification should more clearly define the terms and outline the types of project initiatives that are expected to advance these objectives.

Rationale:

AFIF chose the philosophy that investment in research, development and infrastructure would result in development of a more market-driven economy over the long-term. It is unclear at this time, whether the AFIF program designers wanted more direct investment in marketing, value-adding and diversification than AFIF actually delivered. The strategy, philosophy and expectations for achieving desired objectives should be clear from the outset of future initiatives.

Recommendation 3:

That in future, funding programs that identify value-adding, marketing and diversification as key objectives, ensure that the composition of the Board of Directors include marketing expertise to foster a link between commercialization and research, development and infrastructure.

Rationale:

The AFIF Board embraced a broad definition of industry, allowing representatives of research institutions to be considered as industry. This decision inevitably resulted in a heavier weighting on research and development projects and a lighter weighting on marketing and commercialization projects. In order for marketing objectives to be vigorously advanced, it is important to ensure that marketing knowledge and expertise is a skill found amongst several Board members

Recommendation 4:

That a direct linkage between research results and commercialization be encouraged by involving industry representation in the design, application and, wherever feasible, implementation of the program.

Rationale:

In order to maximize the potential for commercialization, it is important to involve industry representation at the program design, application and implementation stages. AFIF successfully included industry at the design stage; however, industry involvement rapidly declined through the application and implementation stages of the program. Industry involvement can be achieved in a number of ways. Industry representatives can form an advisory board, participate in work plan development, contribute to project selection, assist in the design of communication and technology transfer initiatives, etc.

Recommendation 5:

That the overall timeframe for such a program be lengthened in order for effective research, development and infrastructure investments to be made.

Rationale:

The AFIF Program was required to design and implement an investment strategy over a five year timeframe. Five years is a relatively short period of time to create a strategy, select appropriate long-term investments, implement the strategy and then realize results. In future, research and development programs and the spending of funds could be more effective with a lengthened timeframe to seven to 10 years, or longer. This would allow for careful planning, comprehensive due diligence, leveraging of other funds, project monitoring, responsiveness to emerging issues and time to quantify results and impacts.

Recommendation 6:

That the timeframe provided to allocate resources be extended over the life of the program in order for effective research, development and infrastructure investments to be made.

Rationale:

The AFIF Program allocated the vast majority of the financial resources in the first two years of the program. By doing so, it was not possible to respond to emerging issues and the Board was precluded from building on early program successes. In some cases, due diligence and the sourcing of financial leverage was compromised to facilitate rapid decision-making.

Recommendation 7:

That all infrastructure projects, funded by government programs, complete a comprehensive due diligence process that includes a primary focus on the actual and projected market demand for infrastructure services as well as an overall feasibility of the initiative.

Rationale:

There are several examples of research and development infrastructure, made possible with AFIF financial resources, which are currently operating at very low levels of capacity. In some of these cases, infrastructure managers report that there are not enough clients ready to utilize the services being offered. The market for these services should have been well understood prior to the initial investment. Due diligence must incorporate an assessment of market demand, service potential and feasibility prior to the investment decision.

Recommendation 8:

That program evaluation be embraced as a management tool and include Board of Director involvement at the design, application and implementation phases of the evaluation.

Rationale:

In order for evaluation to be an effective management tool, the group(s) that will be affected by the results must be included in the process. The AFIF Board improved their involvement in evaluation throughout the life of the AFIF program through participation in the Framework Workshop and through representation on the Evaluation Committee.

Recommendation 9:

That public institutions in Saskatchewan, offering agricultural value-added research, processing and development services, adopt coordinated marketing and promotion programs.

Rationale:

AFIF has contributed to a significant advancement in research and infrastructure development platforms in the province. Potential users of these resources will need to have a good knowledge of the facilities that are available in order to maximize the use of these resources to advance value-added processing. Currently, marketing strategies are not coordinated and many potential clients are unaware of the potential support that is available to them.

Recommendations for Potential for Immediate Action

Recommendation 10:

That selected case study profiles be developed in the future that demonstrate the application of key project success factors.

Rationale:

Lessons for future programs can be learned through the direct experiences of those involved in the AFIF program. These experiences should be documented in two to three years time for the use of policy makers in future development programs.

Factors to be examined could include net value of economic activity, employment generated, role of AFIF administration, costs of development and adaptation of technology, and other contributing factors. Based on current information, areas that could be potential case studies include saskatoon berries, livestock feeds, food processing, seed potatoes and bison.

Recommendation 11:

That the AFIF Board, in conjunction with administration, review expectations and provide management direction for the endowment funds and the research chairs that are currently being administered by the University of Saskatchewan.

Rationale:

Current performance is below expectations in three of five research chair positions. Strategic focus, primary objectives and work plans should be developed by program planners and University officials for each of the positions. Where necessary, revisions should be made to ensure that these positions provide effective outcomes. The role of advisory committees, the use of principle funds, and the impact of administrative overhead should be incorporated into future planning.

Based on our analysis of the characteristics and experience of the more successful chairs, research chairs/endowments are most effective when the following criteria are in place:

- Clearly defined objectives in the governing agreement;
- Good use of advisory committee input;

- Correct expertise relevant to the objectives;
- Continuity in the appointment of the Chair; and
- A linkage to a mature organization for management and support.

Recommendation 12:

That consideration be given to reallocating any remaining Human Resource Program funding to the Food Development Centre.

Rationale:

During the term of AFIF, the Human Resource Development (HRD) Program was delivered to food processing companies although the original mandate included programming for non-food companies and horticultural companies. The HRD Program has fallen far short of its targets and objectives. It is logical to place the responsibility for food processing human resource development within the Food Development Centre where an understanding of the training, development and management needs of food processing companies exists. Housing this program under a separate initiative is a duplication of effort and resources and reduces the effectiveness of the program.

APPENDIX 1

AFIF Board Members and Title Designation

Mr. Bob Wettlaufer, Senior Advisor Resource Management
PFRA, Agriculture and Agri-Food Canada
Regina, SK

Ms. Maryellen Carlson, Assistant Deputy Minister
Saskatchewan Agriculture, Food and Rural Revitalization
Regina, SK

Dr. Gordon Rowland, Researcher
Crop Development Centre, University of Saskatchewan
Saskatoon, SK

Mr. Joan Chase, President
Brentwood Enterprises
Meota, SK

Mr. Don Tait, Producer
Elrose, SK

Ms. Janet Ledingham, Producer
Colgate, SK

Mr. Don Russell, Producer
Rosetown, SK

Dr. Louis Greenberg, Assistant Deputy Minister
Saskatchewan Agriculture, Food and Rural Revitalization
Regina, SK

Dr. George Lee, Professor Emeritus
Saskatoon, SK

Mr. Louis Hradecki, Chair, CARDS
Meath Park, SK

Ms. Linda Pipke, Executive Director
Saskatchewan Council for Community Development
Saskatoon, SK

Mr. John Babcock, Provincial Co-Secretary
Saskatchewan Agriculture, Food and Rural Revitalization
Regina, SK

Ms. Elin Viberg, Federal Co-Secretary
Prairie Farm Rehabilitation Administration (PFRA)
Regina, SK

APPENDIX 2

AFIF Project Survey Instrument

(See following)

March 18, 2002

AFIF Project Applicant
Final Evaluation Survey

The Canada-Saskatchewan Agri-Food Innovation Fund (AFIF) addresses both the federal and provincial governments' long-term objectives of creating wealth and opportunities for rural Saskatchewan in the agri-food industry. Within agriculture there are many different sectors and research areas, each with its own opportunities and constraints. AFIF was established to address new and emerging primary production and value-added activities within a number of these sectors.

Your organization has received AFIF support to complete a project that contributes to the goals and objectives of the program. Now that the AFIF program is coming to an end, the Board is launching a final evaluation project designed to quantify the impacts and outcomes of the program funding. Therefore, we are requesting that you participate in the completion of this final project evaluation survey.

Please complete all of the questions that are relevant to your project. (If you have received support for more than one project, complete a survey for each of the funded projects.) Return the survey to Garven & Associates by **April 30, 2002.**

Garven & Associates
201 – 112 Research Drive
Saskatoon, Saskatchewan
S7N 3R3
(306) 975-0025
(306) 975-1075 (fax)
mgarven@innovationplace.com

Information you provide will be held in confidence. The information will be amalgamated and used to create an overall picture of the impacts of AFIF.

If you have any questions regarding the survey, or the evaluation process as a whole, please contact Garven & Associates.

AFIF Project Survey Form

AFIF project name and number inserted here as a pre-printed label.

Project Name: _____
Project Number: _____

Name of person completing survey: _____
Phone number: _____
Email address: _____

Size of project $_____

Questions

1. **What was the primary objective of the project?**

_____

_____

_____

2. **What were the key activities to meet this primary objective? Please check all applicable responses)**

- ❑ Conducting research
- ❑ Creating intellectual property
- ❑ Registering patents/licenses
- ❑ Demonstrating technology/agricultural practices
- ❑ Commercializing research/technology
- ❑ Increasing/strengthening research capacity
- ❑ Increasing/strengthening extension/technology transfer capacity
- ❑ Increasing/strengthening educational/training capacity
- ❑ Improving public/consumer awareness
- ❑ Conducting market development
- ❑ Other (specify): _____

Please list any other activities of this project:

_____

_____

_____

_____

3. **How successful were these project activities in achieving your identified objective?**

❑ Very Successful ❑ Successful ❑ Partly Successful ❑ Unsuccessful

4. **What key factors contributed to the success or lack of success of this project in relation to its objectives? (Please check all applicable factors)**

What Factors Contributed to Project Success?

- ❑ Good project management
- ❑ Good project planning
- ❑ Good guidance from AFIF system in project development phase
- ❑ Project proposal was developed prior to AFIF
- ❑ Good cooperation/collaboration with other organizations
- ❑ Suitable personnel available
- ❑ Adequate funding
- ❑ Ready market/clients for project results
- ❑ Good internal administration within applicant organization
- ❑ Other (specify): _____

Above all others, which of the above was the one key success factor for this project?

_____

_____

_____

What factors reduced the success of the project?

- ❑ Insufficient project management
- ❑ Too little time for good project planning
- ❑ Insufficient funding
- ❑ Length of project approval time
- ❑ Not enough time to properly complete project
- ❑ Difficulty obtaining suitable personnel
- ❑ Lack of cooperation from other organizations
- ❑ Low level of client interest in project results
- ❑ Other (specify): _____

Above all others, what was the one key factor that contributed to lack of success?

_____

_____

_____

_____

5. **What group categories have benefited or are benefiting from this project?**

- ❑ Your institution/organization/company
- ❑ Researchers in other organizations
- ❑ Commercial organizations/agri-business corporations
- ❑ Students
- ❑ Crop producer, livestock producer & processor
- ❑ Processor/manufacturer
- ❑ Consumers
- ❑ General public
- ❑ Others (specify) _____

To date, which specific individual(s) or group(s) directly received benefits from this project? (Please list)

_____

_____

_____

_____

In the future, which individual(s) or group(s) will receive the primary benefit of this project?

_____

_____

_____

_____

6. **If possible, please give the name and phone number of several individuals or groups we could contact to ask about their benefits from or experience in using the results of this AFIF-sponsored project. (Attach a list of end-users/clients)**

_____

_____

_____

_____

7. **What are the specific outputs that have resulted from this project to date? (Please check all applicable responses)**

- ❑ Developed new product
- ❑ Developed new process
- ❑ Developed new market or increased market share
- ❑ Created intellectual property
- ❑ Resulted in registration of new patent/breeder's rights
- ❑ Established new research and development infrastructure
- ❑ Expanded research and development infrastructure
- ❑ Contributed to commercialization of research results
- ❑ Shortened adoption time frame of new agricultural practices
- ❑ Reduced cost of production/processing
- ❑ New market or increased market share
- ❑ Other (specify): _____

Please list other outputs:

_____

_____

_____

8. **How would you describe the specific impact or value of the project to date?**

_____

_____

9. **When is the project impact expected to begin?**

_____

10. **AFIF needs your help to determine the expected benefits from your project.**

Was your project designed to cause (check all that apply):

- ❑ Economic change (benefit) – if so, go to Question 10.1
- ❑ Behaviour change (benefit) – if so, go to Question 10.2
- ❑ Environment change (benefit) – if so, go to Question 10.3

10.1 **If your project was designed to cause <u>economic change/benefits</u>, please identify the benefits below:**

<u>Benefits</u>	<u>To Date</u>	<u>Next 5 Years</u>
Number of new products		
Number of new processes		
Additional project funds leveraged from other sources	$	$
Value of spin-off investments resulting from this project	$	$
Value of new research arising from this project	$	$
Value of new sales/year from businesses using project results	$	$
Value of reduced costs arising from this project	$	$

Additional employment generated by project (in person years)	*# Years:*	*# Years:*
Number of clients benefiting from this project	*Number:*	*Number:*
Number of farmers participating in extension activities	*Number:*	*Number:*

Please provide any other quantitative measures of the benefits/impacts of this project:

_____

_____

_____

_____

10.2 **If your project was designed to cause <u>behaviour change/benefits</u>, please identify the type of benefits and quantitative means of indicating behaviour change over these time periods. (Please include all benefits such as wages and salaries, capital spending on facilities, and other benefit indicators specific to your project.)**

(a) During project implementation to date:

_____

_____

_____

_____

(b) Next five years:

(c) Long-term and/or indirect benefits (6-10 years):

10.3 If your project was designed to cause environmental change/benefits, please identify the types of benefits expected over the following time periods. (Please include all benefits such as wages and salaries, capital spending on facilities, and other benefit indicators specific to your project.)

(a) During project implementation to date:

(b) Next five years:

(c) **Long-term and indirect benefits (6-10 years):**

_____

_____

_____

_____

11. **To whom were the results of this project communicated? (Please check all applicable responses.)**

- ❑ Farmers/agricultural producers
- ❑ Commercial businesses
- ❑ Professional colleagues
- ❑ Students
- ❑ Other research organizations
- ❑ Customers/clients
- ❑ Other (specify): _____

Please list others to whom results of project were communicated:

_____

_____

_____

12. **How were the results of this project communicated/disseminated? (Please check all applicable responses)**

- ❑ AFIF newsletter article
- ❑ Press release
- ❑ Newspaper article

- ❑ Radio/TV report
- ❑ Field day/extension tour
- ❑ Academic journal article
- ❑ Conference paper presentation
- ❑ Poster presentation
- ❑ Other (specify): _____

Please list other ways that the project results were communicated:

_____

_____

_____

13. **How satisfied are you with the communications about this project and its results?**

❑ Very satisfied ❑ Satisfied ❑ Partially Satisfied ❑ Dissatisfied

Please elaborate on the reasons for your response.

_____

_____

_____

_____

14. **If your project resulted in an infrastructure investment, or new/additional capacity or capabilities, what percentage of overall capacity or capability has been utilized to date (on an annual basis)?**

_____%

15. **Please list the factors that impact on current utilization rates:**

What are the key elements of your plan to maximize utilization rates?

16. **Overall, how satisfied are you with your AFIF project experience?**

❑ Very satisfied ❑ Satisfied ❑ Partially Satisfied ❑ Dissatisfied

Why?

17. **What features of the AFIF impressed you and why?**

What features of the AFIF didn't impress you and why?

_____

_____

_____

Thank you for providing responses to this AFIF evaluation survey.
Your assistance is much appreciated.

If you have any questions, please contact Muriel Garven at **Garven & Associates.**

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